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ABSTRACT

This compendium of statistical data on adult literacy assessments spanning a 75-year period is designed to serve as a concise and comprehensive reference source for policymakers, practitioners, and researchers. The introduction provides a theoretical framework for interpreting the assessments described. Summarized in Part 1 are major military and civilian assessments of adult intelligence, aptitude, and literacy, including the following: World War I Alpha and Beta tests for illiterate persons, World War II Army General Classification Test, Armed Forces Qualification Test, Armed Services Vocational Aptitude Battery, Harris surveys of adults' skills in completing various government forms, Adult Performance Level study, Young Adult Literacy Survey, and National Adult Literacy Survey. Part 2 summarizes studies of the assessment of adults' listening and reading skills, intergenerational transfer of literacy from adults to their children, and relationships of literacy to occupations and job performance. Part 3 has three sections: a summary of data on changes in literacy skills in adult literacy programs in California, Illinois, and New York; reading gain score data from various programs around the nation; and data on longitudinal changes in adults literacy skills as a function of participation in adult literacy programs for up to 3 years. The compendium includes 106 tables/figures. (MN)

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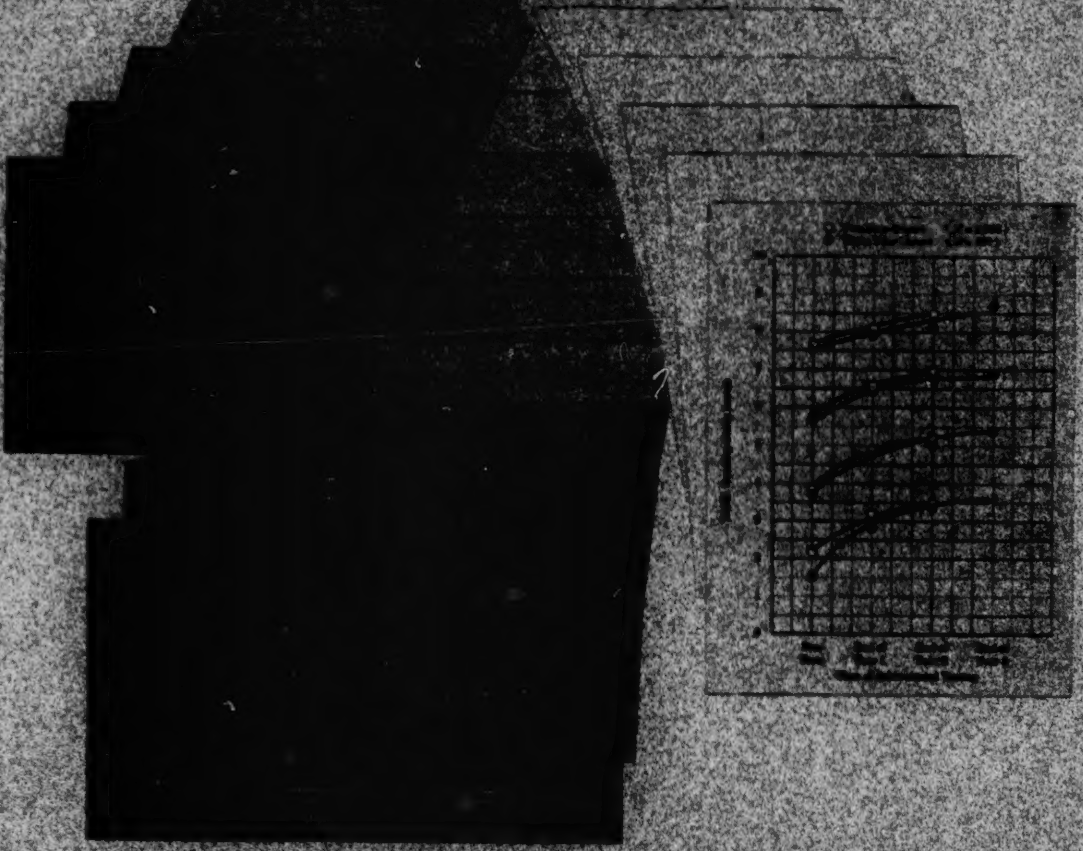
ADULT LITERACY IN THE UNITED STATES

A COMPENDIUM OF QUANTITATIVE DATA
and
INTERPRETIVE COMMENTS



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A COMPENDIUM OF QUANTITATIVE DATA and INTERPRETIVE COMMENTS

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February 1994

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Finally, it should be noted that the ideas and opinions expressed in this report are solely those of the authors and they do not necessarily reflect the official positions, opinions or policies of the San Diego Community College District, the Applied Behavioral & Cognitive Sciences, Inc., the National Institute for Literacy, the U. S. Department of Education or any other governmental or non-governmental organizations

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Executive Summary

Questions of how to assess adult literacy skills and the effectiveness of programs that aim to improve these skills are pervasive in adult education. This report addresses the needs of policymakers, program operators, teachers and researchers for information about methods that have been and are being used to assess adult literacy skills and programs. It also provides a resource for staff development that provides concrete illustrations of the importance of theory in determining the types of assessments that are developed and how various assessments can suggest different approaches to adult literacy development in and out of programs.

This report, *Adult Literacy In the United States: A Compendium of Quantitative Data and Interpretive Comments*, includes extensive quantitative data on the assessment of adult literacy skills and programs ranging from World War I (1917) up to the present. The Compendium presents over 100 pages of graphics and literacy test items with interpretive comments that show the relevance of the data to (1) theoretical and conceptual issues in adult literacy; (2) workforce and workplace literacy; and (3) family literacy and the intergenerational transfer of literacy. Implications for practice, policy, and research are presented throughout the report.

The Compendium contributes to the activities of the National Institute for Literacy (NIFL) that are aimed at assisting the Nation to achieve goal number 5 of the National Education Goals and Goals 2000. Specifically, it addresses NIFL objectives to (1) better understand the assessment of adult literacy skills and the development of promising adult literacy instructional techniques, (2) establish a national data base with respect to assessment tools for adult literacy programs, and (3) disseminate information to adult literacy practitioners, policymakers, and researchers.

Overview of the Compendium

The Compendium provides in three parts a concise and comprehensive reference source for adult literacy policymakers, practitioners and researchers on adult literacy assessments spanning a 75 year period. The major divisions of the Compendium include the following.

Introduction to the Compendium. The Introduction provides a theoretical framework for interpreting the assessments described in the remainder of the report. The framework includes the following concepts from the cognitive sciences.

(1) The concept of a human cognitive system that emphasizes the role of knowledge in literacy along with the information processes involved in oral and written language use and reasoning with graphic tools of thought (flow charts, tables, etc.).

(2) A developmental model of literacy showing how childhood processes develop into adult literacy ability.

(3) An information processing view of learning that emphasizes the active, constructive nature of cognitive development (including literacy) in social contexts .

Part I: Assessing Adult Literacy Skills. Part I of the Compendium summarizes major military and civilian assessments of adult "intelligence," "aptitude," and "literacy." Numerous items are presented, many with commentary to clarify the item's meaning or to relate the item to other information. Assessments reviewed include the following.

(1) The World War I Army Alpha test for literates and the Army Beta test for illiterates.
(2) The World War II Army General Classification Test (AGCT).
(3) The Armed Forces Qualification Test (AFQT) from the 1950's up to the present.
(4) The Armed Services Vocational Aptitude Battery (ASVAB) including sub-tests in job-relatedareas such as automotive, shop, electronics, and mechanical information.
(5) The 1937 studies of adult reading in Chicago by Guy Buswell using "functional, real world" materials like those in the current National Adult Literacy Survey.
(6) The 1971 NAEP assessment of adults with a special analysis of some 21 items that were per formed by 9,13, 17 year olds & adults.
(7) The 1971 Harris surveys of adults' skills in completing various government forms.
(8) The Adult Performance Literacy (APL) study of the early 1970's with data for the various items in the survey.
(9) The 1986 young adult literacy survey (YALS) that developed the Prose, Document and Quantitative scales used in the 1993 National Adult Literacy Survey (NALS).
(10) The 1993 National Adult Literacy Survey (NALS).

Part II: Special Topics. This part of the Compendium summarizes studies of the assessment of listening and reading skills of adults, the intergenerational transfer of literacy from adults to their children, and relationships of literacy to occupations and to job performance.

Part III: Testing of Adult Literacy Development in Education Programs. Data on changes in literacy skills in adult literacy programs in California, Illinois, and New York are presented. Reading gain score data are also presented for a variety of adult literacy programs from around the nation. Finally, rare data are presented on the longitudinal changes in adults' literacy skills as a function of participation in literacy programs for up to three years.

MAJOR FINDINGS

Major findings are summarized for each part of the Compendium.

Introduction

In developing the theoretical framework from the cognitive sciences, a new interpretation of tests of "verbal intelligence," "verbal aptitude," and "literacy" is provided. In this new conception, all these types of tests are considered as tools for attempting to characterize a person's cognitive system for some purpose, such as job selection, placement in educational programs, or making policy decisions about the need for various services. Using this reinterpretation of these various types of cognitive assessments to review research studies and numerous assessment surveys, several major findings have been formulated.

The Nature of Highly Literate Adults. Extensive research is cited that indicates that highly literate adults perform well on numerous tests of "intelligence," "aptitude," or "literacy." High correlations among these types of tests mean that people are being rank-ordered in a similar manner across numerous tests. The tests contain different vocabulary items, paragraph comprehension, and information processing demands. Therefore, the only way that highly literate people can perform well on all such tests is to possess an extensive knowledge base in long term memory and an efficient information processing system in working memory, as outlined in the human cognitive system model.

The Importance of Vast Bodies of Knowledge. An implication of the foregoing for adult literacy practice is that, if adults are to achieve high levels of literacy, they must develop an extensive knowledge base (including both content knowledge and strategy knowledge as outlined in the developmental model of literacy) and very efficient information processing skills for reading and writing. Because the development of large bodies of knowledge and highly efficient processing skills requires extensive time for practice and wide-ranging reading, adult programs must either retain adults for long periods of time, or stimulate adults to engage in extensive reading and writing outside of programs, or do both. However, present adult literacy programs do not focus on developing any particular bodies of knowledge, except to a limited degree in GED preparation.

Where time is limited, literacy programs may develop a fairly extensive body of knowledge, in a restricted domain, in a fairly brief period. Knowledge involved in prose, document, and quantitative literacy as assessed on the National Adult Literacy Survey (NALS), job-related literacy as in workplace literacy programs, or parenting-related literacy as in family literacy programs may be fairly rapidly acquired. However, there is reason to question whether this new knowledge will be retained unless it is actually used either in additional education and training programs or in day-to-day activities.

The Importance of Practice in Reading. Several assessments of adult literacy skills and practices (e.g., reading books, magazines, newspapers) show that years of education, amount of practice, and increased skill go together. Highly literate adults have more education and engage in more reading practices. An important implication for adult literacy programs is that efforts should be made to get adults to engage in larger amounts of reading in various types of literacy practices both inside and outside of programs. Extensive free-reading practice may be as important as direct instruction in producing higher levels of literacy.

Part I: Assessing Adult Literacy Skills

Similarity of Literacy Items Across Time. To a large extent, the tasks found on literacy assessments operationally define what various experts, advisors, teachers of adults, and test-developers think about the nature of literacy. Despite the considerable debates about the suitability of different types of literacy tasks that are assessed in national surveys, such as whether to use multiple-choice or constructed response items, "academic" or "real world" items, etc., when the actual items are examined that various advisory boards have approved over several decades, there appears to be a remarkable similarity among items over the last 75 years.

Similarity of Findings Across Time. Beginning with the World War I assessments in 1917, a number of trends have remained salient across time.

(1) Higher educated adults perform better than less educated adults.
(2) Younger adults perform better than older adults.
(3) Adults in western, eastern, and northern states perform better than those in southern states.
(4) Whites perform better than African-Americans or non-native language speakers.
(5) Adults in professional, managerial, and clerical occupations perform better than adults in laborer, agricultural, and other relatively unskilled occupations.
(6) Higher income groups perform better than groups with lower incomes or on welfare.
(7) Higher educated adults engage in a greater amount of reading of books, magazines, and news papers.

An implication of these findings for policymakers and researchers is that any number of literacy assessments can be used to rank order the adult population with regard to verbal "intelligence," "aptitude," or "literacy" and the same general trends can be followed. This suggests that, if the concern is simply to identify adults who are high, medium or low in literacy skills, consideration should be given to research for identifying the most cost-effective methods of assessing adult literacy skills. For instance, the very simple vocabulary and paragraph comprehension tests of the Armed Forces Qualification Test (AFQT) produce about the same distribution of adults in five literacy levels as does the more extensive (and expensive) National Adult Literacy Survey (NALS).

An implication for practitioners is that if programs aim to produce highly literate adults, they should produce graduates who can score well on any of these "verbal" or "literacy" assessments.

Part II: Special Topics

Listening and Reading

Less Skilled Readers are Less Skilled Listeners. A limited number of studies were reviewed that used group-administered or individually-administered tests to compare reading to listening skills. These studies indicate that, as a general trend, adults who score low on reading tests also score low on listening tests. In most cases, they do not perform any better by listening than by reading, except at the very lowest reading levels (e.g., below the second grade level). This line of research is important because the "gap" between a person's reading level and his or her "reading potential" identified by an orally-administered "intelligence" test is used to identify adults who are "learning disabled" or "different." The "intelligence" test is very similar to a "listening" test. Hence, studies of listening and reading are important in the diagnosis of adult learning disabilities.

Knowledge and Listening. An implication of the finding that less literate adults may also be underdeveloped in listening vocabulary and comprehension is that less literate adults possess a more limited knowledge base than more highly literate adults. Therefore, programs that aim to make large increases in adults' reading skills by a brief program of decoding will find that this does not tend to happen. Even though high levels of reading decoding might be developed (though not in a brief period of time), if the person does not possess a high amount of knowledge expressible in language, then considerable time will be required in extensive wide-ranging reading to acquire the vocabulary and conceptual knowledge that is needed, along with efficient decoding skills to achieve at high levels on literacy assessments.

The Intergenerational Transfer of Literacy

Parents' Education Level is Related to their Adult Children's Literacy Skills. Data are presented showing that parent's, and especially mother's education level is related to the literacy skills of their children at ages 9, 13, 17, and in adulthood. This is true for both military and civilian assessments and for whites, blacks, and Hispanics. However, for the minority groups studied, the higher educated parents do not transfer higher levels of skills to the same extent that whites do. For instance, white mothers who are college graduates have adult children who score on the average at the 80th percentile on the Armed Forces Qualification Test (AFQT) while African-American mothers who are college graduates have adult children who score on the average below the 50th percentile. Research is needed to determine whether adult basic education or family literacy programs can improve the amount of intergenerational transfer of literacy from parents to children over that which occurs naturally in the situations that produced the data summarized in Part II of the Compendium.

Literacy, Occupational Status, and Job Performance

Literacy is Related to Occupational Status. Findings from the World War I data on "intelligence" to the 1993 data on "literacy" in the National Adult Literacy Survey (NALS) indicate that cognitive ability is related to the occupational status that adults achieve. Data from the Young Adult Literacy Survey of 1986 on the literacy skills of adults and the literacy skills of members of various occupational groups show that about 63 percent of whites, 39 percent of Hispanics but only 20 percent of blacks have literacy scores on prose, document, and quantitative literacy equal to or greater than the average score of Clerical workers. Black college graduates have average literacy scores below the average for Clerical workers. An implication of these findings is that if jobs are changing to demand even higher levels of literacy, as some have argued, then African-Americans may find it increasingly difficult to compete for and enter into higher-skilled, higher-paying occupations. There is clearly a need to better understand the implications of the findings from the various adult literacy surveys, the demands of workplaces for literacy skills, and the success of higher education in preparing all graduates to meet these demands.

Literacy is Related to Job Knowledge and Job Task Performance. Studies by the military relating reading ability to paper-and-pencil job knowledge tests and "hands-on" job-sample tests are summarized in Part II of the Compendium. Findings indicate that reading is related to higher levels of performance on these measures of job proficiency, though the correlations are not large. One study indicates that if workers both have higher reading skills and use them, they may increase their productivity on job sample tests by as much as 15 to 20 percent. No research outside the military services was found that explores relationships among literacy skills and various measures of job proficiency. The data reviewed in the Compendium are now almost a quarter century old.

Part III: Testing of Adult Literacy Development in Education Programs

Judging the effectiveness of educational programs designed to improve the literacy levels of adults is becoming increasingly important in the current accountability and assessment climate. Part III of the Compendium focuses on the assessment of literacy skill development in a wide variety of programs across the nation, including California's federally-funded 321 programs, community college-based programs in Illinois, programs in New York City and a variety of programs in correctional facilities, the Job Corps, job training centers, family literacy programs and others.

Pre- and Post -Test Scores and Gains in Adult Literacy Programs. Viewing across all the programs, the data indicate that adult literacy programs are uniformly successful in increasing adult literacy skills by 0.5 to 1.5 "years" in anywhere from 1 to over 200 hours of instruction. This observed gain is only minimally influenced by the entering level of adult's skills or the hours of instruction between pre- and post-tests.

Longitudinal Data Show Little Gain After the First Post-Test. Only two data bases were found that presented repeated testing of adults who stayed in literacy programs for a year or more. In both data sets, an initial year or so of gain was observed, and then repeated assessments indicated that the rate of gain slowed and became almost level. Students in New York City who were in programs for up to three years gained 2.0 years of skill, from the 1.5 grade level to the 3.5 grade level. A year and a half of that gain was made between the pre-test and the first post-test given a year later.

It should be noted that all test scores presented were average scores for programs. Averages conceal the large differences that may occur among the individuals in the programs. Many of the programs may have included adult students who developed quite a bit of skill. Similarly, however, there may have been many students who made little or no gain.

A general finding is that typical program evaluation reports do not provide much information about variance in scores; standard deviations are typically not reported nor are the distributions of scores on pre- and post-tests. Importantly, no studies or reports were found in which concern was expressed about the level of gain reported and what might be done to increase adults' learning as measured by standardized tests during the program. More likely, when low test score gains were reported, the standardized tests were criticized as invalid indicators of what was actually learned in the program. Generally, no alternative indicators of growth in achievement were reported.

Hopefully, the extensive review of literacy assessments presented in this Compendium, with the major findings outlined above, will lead to new approaches both to improving the extent of growth that adults achieve both in and out of adult literacy programs, and to new, cost-effective measures that can inform policymakers about general literacy trends among adults.

INTRODUCTION

INTRODUCTION

ADULT LITERACY IN THE UNITED STATES

A COMPENDIUM OF QUANTITATIVE DATA

ADULT LITERACY IN THE UNITED STATES

A COMPENDIUM OF QUANTITATIVE DATA

This Compendium presents a large body of quantitative data obtained in numerous studies since the U.S. Army introduced the mass testing of adult cognitive skills in World War I. Concepts from educational research and the field of *cognitive science* are used to interpret these assessments. The data and interpretations provide new insights into the nature of adult literacy and its development. These insights form the basis for suggestions about how to produce more effective approaches to adult literacy assessment and education.

The Compendium and its interpretive comments should be of use in staff development programs for adult educators. It can serve as a resource for university courses in psychological testing and for organizations engaged in the development of adult literacy assessments. It can also be used directly by adult literacy teachers, their students, and interested others as informal checks of how their own literacy skills compare to the skills of others across the last seventy-five years. This form of self-checking using test items from different time periods can also reveal the extent to which literacy assessments reflect the cultural context of the time.

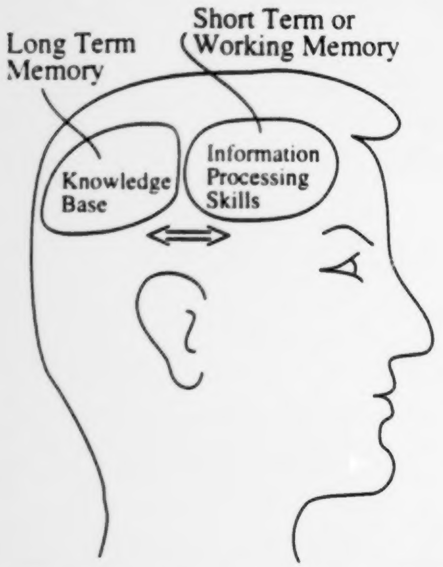
A Cognitive Science Framework for Interpreting the Assessments of Adult Literacy

In all of the literacy assessments reviewed in the Compendium, a similar process was followed by those administering the tests. First, instructions were given to groups or individuals about the tests they were to take. Then, some form of test was administered that (1) presented some information display, either spoken or in a graphic format, such as written language, (2) posed some mental reasoning task to be performed on the information displayed, (3) required some responses to be made by the examinees that were (4) used to arrive at a score for each person in the group, that (5) was used to make inferences about people's cognitive abilities that could be used to (6) makes inferences about how well people will perform in some other context beyond the test situation, such as in a training program, on a job, or in a community activity.

Figure 1 presents a simple conception of a *human cognitive system* at work in a test environment like that just described. The person possesses a long term memory that contains the person's body of knowledge, including among other things, language knowledge and knowledge about how to do things (procedural knowledge), including grammar and reasoning processes. To a large extent, all of the assessments reviewed herein can be considered as attempts to understand what knowledge the person possesses and/or what tasks the person can accomplish by drawing on the knowledge and reasoning processes in the cognitive system.

What Figure 1 makes distinct are the differences between the knowledge stored in long term memory and the language, reasoning and other information processing processes that are used in working memory to represent and think about knowledge.

FIGURE 1 Model of a human cognitive system used to interpret studies on the assessment and educational development of literacy and other cognitive abilities.



Simple Model of Human Cognitive System

Long Term Memory contains the knowledge base with language and various information processing knowledge.

When thinking is taking place, information processing occurs in Short Term or Working Memory. The information processing skills operate on information in the knowledge base and information picked-up from "knowledge bases outside the head," such as books, speech, and non-language sources.

Reading can be improved by increasing knowledge in the base or by improving or adding to information processing ability, or

Extensive research by the armed services (surveyed in Sticht, 1992) indicates that three major factors that render people able to score high on either intelligence, aptitude or literacy tests are (1) the possession of vast bodies of knowledge in long term memory, (2) the ability to process information in working memory in a very efficient manner, and (3) the efficiency with which these two system components can interact.

A general finding from numerous assessments of adult cognitive abilities is that, with a broad range of abilities in the test population, there are high correlations among performance on intelligence, aptitude or literacy tests. In one study by the Department of Defense, correlations between the military's verbal aptitude test scores and scores on any one of five different standardized tests of reading were in the .8 to .9 range, about as high as they could get given the psychometric properties of the tests (Waters et. al., 1988, p. 46).

These high correlations indicate that on any one of the tests taken at random, highly literate persons will achieve in the upper range of scores, moderately literate persons will score in the mid-range, and less literate persons will score in the lower range of scores.

An implication of these findings is that, if adult literacy education programs are to be judged successful in producing graduates who are considered *highly literate*, these graduates should be able to take any number of standardized tests of either intelligence, aptitude or literacy and perform well on them, certainly above the 60th percentile. Graduates considered *moderately literate* should be able to score in the mid-range on any one of these types of assessments, i.e., from around the 40th to the 60th percentiles. Adults who leave programs unable to reach the mid- or high-levels of literacy will tend to perform poorly on any one of these assessments of cognitive abilities.

A Developmental Perspective

In addition to drawing on the model of the human cognitive system, we interpret findings in the Compendium from time to time following a simple developmental model of the major processes, knowledge bases and sequences of development that people go through in becoming literate.

The developmental model is based on the understanding that, living in social groups with shared cultural experiences, we form normative expectations for what people at different ages can and cannot be expected to do. In a typical case, one will not use a form of addressing a person's cognitive system that the person is not expected to be able to process. For instance, one does not typically hand a written note to a two-year-old that asks for personal information such as a name. But one would ask for the child's name using oral language. Here the normative assumption is that, typically, a two-year-old can talk and comprehend simple oral language but generally cannot read.

Similarly, one does not ask an infant for information because it is assumed that typically infants cannot comprehend and speak oral language well enough to communicate. But facial expressions, gestures, laughing sounds, etc., might be used in a communicative manner to play with the infant and receive responses such as laughing, smiling, hand and arm movements, etc.

In short, in our literate society, we have expectations for how infants, two-year-olds, six-year-olds, adolescents, and adults develop their cognitive systems over time. We have an implicit developmental model of literacy that guides our use of communication methods in different circumstances.

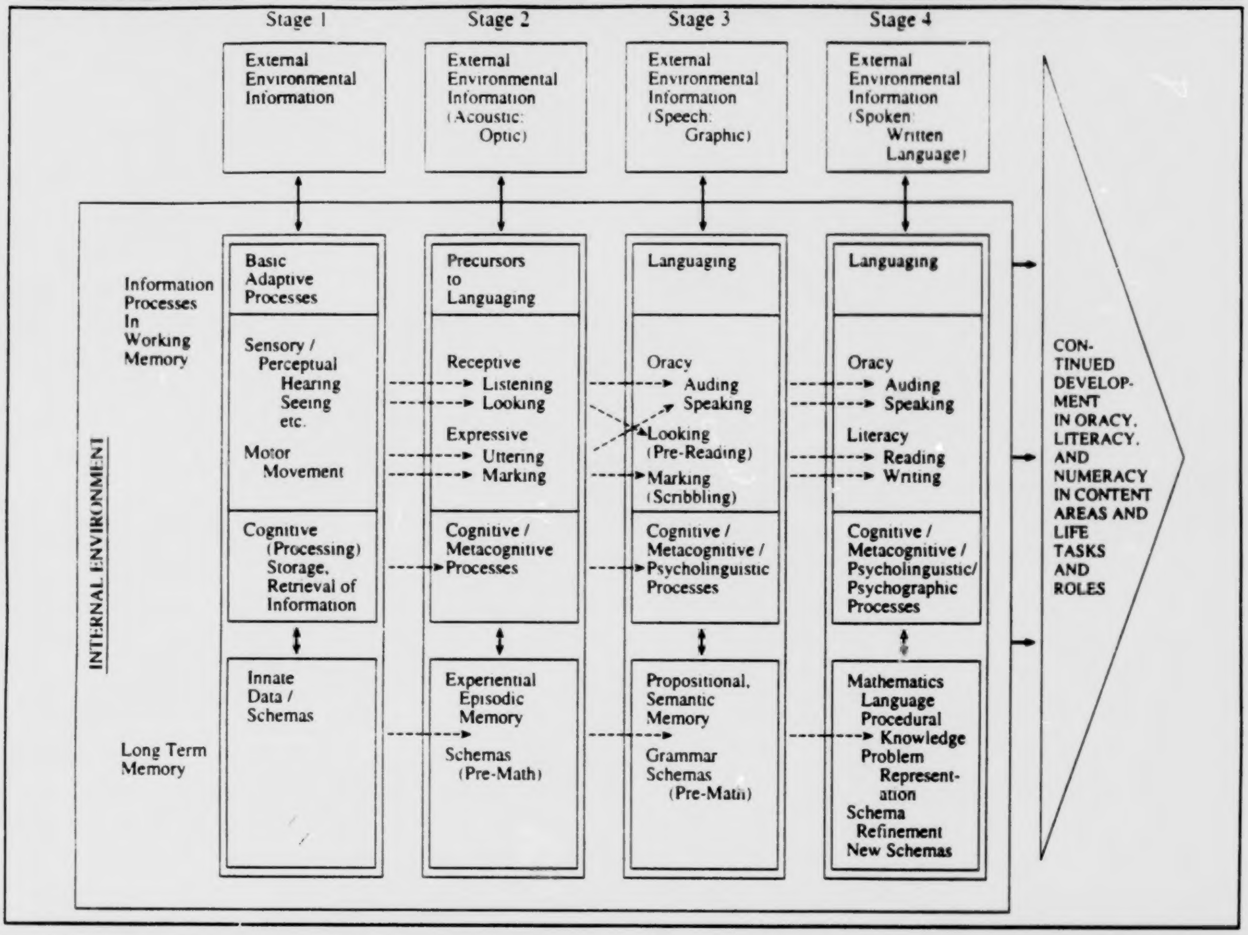
In several research projects, the implicit developmental model of literacy was made explicit and included a large number of concepts from cognitive psychology. This model of "the typical case of a child growing up in our literate society" is presented schematically in Figure 2 (see Sticht, Beck, Hauke, Kleiman & James, 1974 for an extended discussion of an earlier version of the developmental model of literacy and a review of literature related to hypotheses derived from the model; Sticht, 1992 reviews testing data interpreted in terms of the developmental model).

Before addressing the details of the model, several orienting comments regarding the figure are in order. First the figure is meant to portray a developmental sequence when examined from left to right. The sequence begins with the newborn infant, and goes through stage 4 in which literacy skills are functional. The broad arrowhead on the far right is meant to imply continued development over the lifespan. The development of literacy, language, and knowledge is a lifetime activity.

Examining Figure 2 from top to bottom, the top series of boxes is meant to represent the environment in which the person exists. This is the environment "outside the head." This external environment makes available information displays that the person can explore and transform into internal representations of the external information. These internal representations are developed by the processes in the second series of boxes labeled, on the far left, Information Processes in Working Memory. These processes go on "inside the head," and merge information picked up from the external information displays with information picked up from the third series of boxes, labeled on the far left as Long Term Memory. Thus, the processes in the working memory are used to pick-up and merge information from outside the brain with information in long term memory inside the brain to construct an internal representation of the world as currently experienced, including the meaning of symbolic information when this is a major domain of information being extracted from the external world at a given time.

At the top of Figure 2, there are references to four "stages." In the present case, the concept of "stage 1" does not refer to automatic and immutable cognitive "unfoldings." Rather, the term refers to what would typically be observed at different times if one

Figure 2 A Developmental Model of Literacy


Stage 1
Stage 2
Stage 3
Stage 4
External Environmental Information
External Environmental Information (Acoustic: Optic)
External Environmental Information (Speech: Graphic)
External Environmental Information (Spoken: Written Language)
INTERNAL ENVIRONMENT
Information Processes In Working Memory
Long Term Memory
Basic Adaptive Processes
Sensory / Perceptual Hearing Seeing etc.
Motor Movement
Cognitive (Processing) Storage, Retrieval of Information
Innate Data / Schemas
Precursors to Languaging
Receptive Listening Looking
Expressive Uttering Marking
Cognitive / Metacognitive Processes
Experiential Episodic Memory
Schemas (Pre-Math)
Languaging
Oracy Auding Speaking
Looking (Pre-Reading)
Marking (Scribbling)
Cognitive / Metacognitive / Psycholinguistic Processes
Propositional, Semantic Memory
Grammar Schemas (Pre-Math)
Languaging
Oracy Auding Speaking
Literacy Reading Writing
Cognitive / Metacognitive / Psycholinguistic/ Psychographic Processes
Mathematics Language Procedural Knowledge
Problem Representation
Schema Refinement
New Schemas
CONTINUED DEVELOPMENT IN ORACY, LITERACY, AND NUMERACY IN CONTENT AREAS AND LIFE TASKS AND ROLES

studies children growing up in our literate society. For instance, stage 1 refers to the newborn infant who is considered to be innately endowed with the Basic Adaptive Processes involved in sensory/perceptual processes such as hearing and seeing, etc., motor movement, and cognition, including the processes needed to acquire information, mentally manipulate it, store it in memory, form knowledge structures out of it, retrieve and represent the information in various ways. In stage 1, these processes are assumed to work more or less automatically without conscious control, hence an observer would note that the infant seems "captured" by stimuli, rather than selective in observing information in the world.

Stage 2 represents the emergence of conscious control over information pick-up and manipulation. This active process of attending to information distinguishes listening from hearing, and looking from seeing, as information pick-up processes. Listening and looking build internal representations that may be called images. Images may also be constructed from data stored in long term memory. These internal imaging processes are frequently assessed in aptitude tests as "spatial perception" or "mechanical comprehension" in which it is necessary to mentally visualize and rotate cog-and-gear assembles to determine what effects this movement might have on some other gear.

Stage 2 also introduces the concept of active or working memory, which is defined by the occurrence of consciously controlled information processing activities. Working memory is a limited memory that can be easily overloaded (e.g., attending to two or three things at once is difficult — if not impossible). Many of the information processing activities the person acquires will be techniques to overcome active memory limits (e.g., repeating information to oneself keeps the information in active working memory until it can be applied). The "stage" aspect in cognitive development shows itself by the ability of the infant to attend to information selectively. This is a cognitive capability which, once developed, is a permanent feature of cognition that distinguishes the stage 2 child from the stage 1 child.

Stage 3 represents the development of language processes out of earlier processes and knowledge stored in long-term memory. In developing oral language, the listening process is used in attending to spoken language to learn the words and grammar of language. Thus, listening plus languaging, occurs simultaneously. This joint occurrence is given the special name of auding. On the production side, the joint occurrence of uttering (making sounds through the mouth) with the production of word forms from the language pool, and stringing the word forms together to make sentences using the rules of grammar, produces the special process called speaking. Auding and speaking comprise the oral language information reception and production skills. Speaking is used to represent information that the person has in his or her mind "outside the head" and in the acoustic medium, while auding is used to pick-up and transform speech information displays into knowledge in the mind of the listener. To an observer, the stage 3 child can respond to and produce oral language, at least to some minimal degree. Again, as with conscious attending, once oral language has begun to emerge, the cognitive system is permanently modified (barring physiological trauma of some sort), and the person is no longer capable of exclusively prelinguistic modes of thought.

In transitioning to stage 4, the information processing skills of looking and marking are used to learn a representational system which, in many respects, represents the spoken language in a different medium light, and in a more or less permanent graphic display: the written language. Looking at written language and transforming the written language into meaning is called reading. Writing is the special use of marking skills to produce graphic language (and other symbols and symbol systems).

In the typical case, people develop a fair amount of competence in oral language before they are exposed to formal instruction in reading in elementary grades (though informal learning of literacy may begin in the home and community in literate cultures). Written language skills build upon the earlier developed oral language skills and add new vocabulary and concepts, as well as special knowledge about how to represent information in the graphic medium, to the person's knowledge base. In turn, learning new vocabulary and conventions of language through reading and writing enlarges the person's oral language abilities. The large arrow at the far right in Figure 2 is meant to represent the notion that the development of oral and written language ability may continue indefinitely as the person studies and develops new knowledge domains.

A major component of Figure 2 is the person's long term memory or "knowledge base" discussed above as a part of the *human cognitive system*. The long term memory contains all the knowledge developed by the person in interaction with the environment. Much of the knowledge acquired by the person will not be understood in consciousness (for example, the rules of grammar). Rather, it will be unconsciously used to accomplish tasks such as developing language competence and comprehending the events of the world. In addition to the general world knowledge and processes that are in the mind, though not necessarily accessible to conscious understanding without considerable analysis, the memory also contains the language knowledge (words and grammar) that can be used to represent information that arises from experience in the world (e.g., bodies of knowledge about machines, parts of the body, houses, neighborhoods — sometimes called "schema" or "mental models") and from didactic instruction, as in training programs (Sticht, 1992).

The model indicates that the development of the oracy skills of speaking and auding are built upon the prior development of prelinguistic knowledge through information processing activities. It is important that it be understood that this early, prelinguistic cognitive content, or knowledge, will form the foundation for the acquisition of new knowledge over the person's lifetime, including that knowledge known as "literacy."

Much of this knowledge will remain personal, and will not be explicitly represented in language for communication to others. Nonetheless, such personal, tacit knowledge, which includes perceptual learnings and general knowledge of "how the world works," will be absolutely necessary for learning to comprehend the spoken, and later the written, language. This reflects the fact that language is selective in the features and concepts chosen to be represented. We may think of language as producing a verbal figure, which can be comprehended only in terms of its relationship to a nonlinguistic conceptual *ground* of "world knowledge." A simple illustration of the role of "world knowledge" in literacy training is seen in the recommendation to give students experience with objects and events in the world through field trips, demonstrations, movies, etc., before they read about them. This approach provides an experiential base or a "world knowledge" which will permit a deeper comprehension of the words and concepts the students read, and greater "access" to prior knowledge via perceptual learning.

A final aspect of the model is that it recognizes that, on the one hand, the literacy skills of reading and writing utilize the same knowledge base that is used in auding and speaking, plus the special decoding and encoding skills of reading and writing. On the other hand, the very nature of the written language display — characterized by being more or less permanent, being arrayed in space, and utilizing the features of light (color, contrast) — makes possible (i.e., affords) the development of skills and knowledge entirely different from those involved in oral language.

The model incorporates the role of prelinguistic looking and marking abilities as contributors to later utilization of the visual display of written language in conjunction with graphic marks such as lines, white space, and color to develop graphic tools for thinking and problem solving like matrices, flow charts, color coded graphs, and so forth. These tools combine with written language and non-language graphic symbols, such as arrowheads and geometric figures, to produce analytical products beyond those obtainable through the fleeting, temporal, oral language.

A point to be emphasized is that much of the acquisition of literacy is not simply learning to read; that is, it is not just learning a graphic language system that can be substituted for the oral language system. Rather, a large part of learning to be literate, and perhaps the most important part for acquiring higher levels of literacy, is learning how to perform the many tasks made possible by the unique characteristics of printed displays — their permanence, spatiality, and use of light, and using that knowledge to develop large amounts of new knowledge (see the discussion of the Army's Beta test in Part I to learn how "literacy," considered here as reasoning while engaged in visual information processing in working memory, was used by military psychologists to assess "intelligence" without having the person access much information in long term memory).

The foregoing, and Figure 2 briefly summarize the structure of the developmental model of literacy and emphasize:

- An architecture for a *human cognitive system* that contains a long term memory (knowledge base) and a working memory. The mind draws upon certain procedural knowledge, including language, that is in the long term memory and uses that procedural knowledge for processing information taken both from the long term memory and from the external world. The latter serves as a sort of "external memory" that displays information to be picked up by the sensory systems and internal processing skills and merged with prior knowledge in the process generally called "learning."

•The development of additional knowledge, including that knowledge known as literacy, as extensions to or transformations of earlier knowledge. In particular, the developmental model emphasizes the development of oral language from earlier, prelinguistic knowledge, and literacy as an amalgam of prelinguistic (stages 1 and 2) and linguistic (stage 3) knowledge. Literacy includes the procedural knowledge (processes) used in guiding information pick-up and processing by the visual, auditory, and other perceptual systems, and declarative knowledge generally representable in oral and graphic symbol systems (this includes content knowledge such as mathematics, geography, etc. when learned).

Learning as Information Processing

In addition to the models of the human cognitive system and the development of literacy, the conceptual framework to be used in interpreting literacy assessments in the Compendium includes a conception of learning as the outcome of constructive, information processing activities.

The information processing approach to learning emphasizes internal mental processes involved in learning. It views the person as an active, adaptive organism busily ordering and arranging an internalized representation of life space. According to this view, learning is the result of an active, constructive process on the part of the learner working with information from the internal or external environments. This differs from a strict behavioristic conception in which learning is the result of some fixed, automatic process of association among stimuli, responses, and their consequences.

The information processing approach to learning emphasizes internal strategies for dealing with information, such as the use of imagery or mnemonic (contextualizing) devices to aid in learning a list of words. Thus, the information processing position would lead us to seek different internal processing strategies even though certain stimulus-response sequences may be the same. For instance, interest would focus not only on whether or not a problem is solved, but also upon how it was solved. It is thus analytic, stressing the detailed analysis of tasks in regard to the knowledge and mental operations involved "inside the head" between the occurrence of a stimulus and a subsequent response (i.e., "cognitive task analysis").

A most important aspect of the information processing approach to learning is the emphasis upon the active, constructive nature of the person as he or she draws upon prior knowledge to function in the current learning context. This suggests that cognitive assessment and instructional programs should offer an environment for and a stimulus to active information seeking, mental representation and re-representation to bring a larger share of prior knowledge to bear on the learning task, and external communication to check, confirm and further develop learning.

In summary, the theoretical framework used herein to interpret research on literacy includes the concept of a human cognitive system comprised of a long term memory with its knowledge base and a short term working memory that operates through information processing activities on the information in the long term memory and the external world of information. Cognition includes both knowledge and the processes for developing knowledge.

The long term memory develops over the life of the person as the latter undergoes the transitions from pre-language, to oral language, to written language-based information processing. As the key developmental information processing outcome in our literate society, the person comes to acquire the information processing skills involved in a wide variety of cognitive acts involving graphic symbol systems for language processing and for performing various cognitive tasks involved in problem solving and reasoning.

This developmental progression of the person occurs as the result of active, constructive information processing activities that represent and re-represent knowledge to forge new learning from old. The new knowledge adds to the knowledge base in the long term memory and is activated in various contexts through constructive processes that are sensitive to the different contexts. This means, for instance, that even though one possesses certain knowledge and skills, they may not be accessed if the context in which the person is immersed does not activate them.

In the Compendium, this cognitive science framework of a human cognitive system, developmental model of literacy, and an information processing approach to learning, is used to reinterpret and summarize the large body of data concerned with the assessment of literacy over the last 75 years.

What Makes People Highly Literate?

If, as indicated earlier, the long term memory must possess vast bodies of knowledge and if high levels of information processing skills in working memory are needed to be highly literate, then how do the highly literate acquire this knowledge and skill?

Quantitative data from assessments of adult literacy in 1937, 1973 , and 1986 (see pages 43, 63, and 99 in this Compendium) suggest what might be called the "triple helix" of literacy development: skill, practice, and education. A salient finding across the last half century is that people with higher levels of education have higher levels of literacy skill and they engage in higher levels of literacy practices, i.e., they read books, magazines and newpapers more frequently than do the less educated and less skilled.

The data on the intergenerational transfer of literacy in Part II shows that better educated parents tend to have children who achieve better in school. A considerable body of evidence indicates that preschool children from homes that have higher income levels and where parents have higher education levels frequently acquire considerable oral language vocabulary and literacy knowledge before they enter school (see chapters by Mason & Kerr and Diana Slaughter-Defoe in Sticht, Beeler, & McDonald, 1992). These children have typically engaged in some forms of *literacy practices*, such as scribbling with pencils and crayons as "pre-writing", and perhaps they have even learned to print their names and other words.They may have been read to and developed knowedge of the "sound of printed language." They may have learned the alphabet and even how to read simple stories.

As children who have engaged in pre-school literacy practices and developed pre-school literacy skill enter school, they tend to do better in school, and the school directs their reading into areas that they might not engage in otherwise. As children and other people read more and more widely, they develop higher levels of information processing skills involved in recognizing printed words and other features of the written language, and they learn the meanings of more and more words, i.e., they develop more extensive bodies of knowledge. This in turn helps them do well in school, so they pursue further education. This guides them to engage in additional reading practices, and, in turn this helps them develop more efficient reading skills and helps them acquire more knowledge.

This scenario suggests that while higher levels of skill, education and practice typically go together, it is possible to develop high levels of literacy through the engagement in high levels of practice, without attending formal education for very long. This may have been illustrated in the World War I assessment of "intelligence." The fact that officers with very few years of education scored quite high on the Alpha test of "intelligence" for literates, was interpreted by the military psychologists of the time to indicate that the test measured "innate intelligence." But it seems likely that what made it possible for the unschooled officers to score fairly high on the Alpha was the knowledge and information processing skill they had acquired, perhaps by doing considerable independent reading (see pages 19 - 24 for a discussion of the Alpha and Beta tests and examples of the items on each of these tests).

The Importance of Practice for Literacy Development

There is a growing body of evidence to suggest that children's development of literacy skill across the school years results to a large extent from the reading they do outside of school (Anderson, Wilson, & Fielding, 1988; Stanovich, 1993). Anderson, et. al. reported a wide range of amount of reading of books, magazines, comics, and mail for fifth grade students in a year. Children at the 30th percentile of amount of out-of-school text reading read about 251,000 words a year. While children at the 70th percentile of amount of out-of-school reading read some 1,168,000 words a year. Amount of reading was significantly related to reading achievement.

Children in the 3rd through 6th grades with reading skills at the 25th percentile have been found to lose over the summer almost half of the skill they gain during the school year. While those at the 75th percentile actually gain skill over the summer (Barbara Heynes, as reported in Berlin & Sum, 1988, p. 37, Figure 10).

Among adults, higher levels of engagement in reading practices has been found to be associated with higher levels of education, vocabulary, and cultural knowledge, such as knowledge of names of famous authors, magazines, and other people (West, Stanovich, & Mitchell, 1993).

The combined evidence suggests that *practice in reading*, and especially the reading of books, is a potent contributor to the development of vast bodies of knowledge in long term memory and efficiency in word recognition and other aspects of the processing of language and graphic displays of information in working memory.

The low achievement gains in the pre- and post-test scores of adult literacy programs found in Part III of the Compendium may reflect low levels of practice in reading by students outside of the literacy programs (or, for that matter, inside the program. We have very little information on "time on task" in adult literacy classrooms or learning centers). To date there is very little information about the extent to which adults increase their out-of-class reading as a consequence of participating in adult literacy programs. The data above would seem to suggest that if such programs do not lead to fairly large increases in out-of-class reading, then the adult learners are not likely to develop the vast bodies of knowledge and efficient information processing skills needed to achieve high levels of literacy.

Loss of Literacy Ability

Some evidence exists to suggest that adult students who leave literacy programs may not only fail to develop additional literacy skills if they do not engage in further literacy practice, but also that they may actually, and fairly rapidly, lose new found skills if they are not practiced after the program (Sticht, 1975, p. 118). In military research, U. S. Army literacy students who received job-related reading training and then went on to job technical training were retested about eight weeks after leaving the literacy program. It was found that at the end of the six week literacy program the students had gained 2.4 reading grade levels (RGL) of skill in job-related reading. Eight weeks later, after completing job technical training, that gain dropped to 1.9 RGL, for a retention rate of 80 percent. However, while gain in general literacy was about 1.0 RGL at the end of the job-related literacy program, eight weeks later that gain had dropped to 4 months (or 0.4 RGL), for a retention rate of only 40 percent of what had been gained in general literacy.

The foregoing suggests that although the amount of reading practice may have dropped when the students left literacy training and entered job technical training, they nonetheless continued to practice reading job-related materials. This may have helped them maintain their gain in job-related literacy.

However, since it is likely that they did not engage in as much reading practice as during the literacy program, this may have contributed to their loss of most of their gain in general literacy.

Overview of the Compendium

Part I: Assessing Adult Literacy Skills.

Part I of the Compendium includes data from the testing of adults to determine the distribution of literacy skills in the population. Data are summarized for the period beginning with the Army's introduction of mass testing in 1917 during World War I and ending some seventy-five years later in the 1992 assessment of adult literacy skills by the U.S. Department of Education. Data gathered in studies falling between these two points in time are also summarized.

An interesting observation is that, despite considerable debates about what sorts of tasks adults should be asked to perform to indicate their degree of literacy, whenever test specialists, educators and citizen groups have gotten together to decide how to assess adult literacy, the actual tasks that end up in assessment instruments look remarkably similar over the seventy-five year period. The major findings or trends in the data also look remarkably similar.

Part I of the Compendium presents not only summaries of the data on adult literacy skills from this seventy-five year span of America's history. Additionally, it presents numerous actual test items that were used in these studies to assess adult literacy skills. This permits readers to study these items to determine for themselves whether they appear to be suitable tasks that literate adults in the United States should be able to perform. Also, it permits adult literacy teachers to use these items with their students as informal indicators of literacy development in adult literacy programs. Indeed, both adult teachers and adult learners (and others) may find it interesting, and informative, to try their skill at doing tasks from across time, such as items from World Wars I (1917) and II (1940s), or the 1930's and 1970's.

Part II: Special Topics

Part II of the Compendium examines three special topics in adult literacy assessment. First, relationships between *listening and reading* vocabulary and comprehension are examined. As suggested by the developmental model of literacy summarized above, children first develop a fair amount of knowledge and language ability before they formally begin learning reading and writing. Then, when they enter school, one of the primary aims of reading instruction is to permit the child to access oral language encoded information via the printed display.

When applied to adults, it is frequently believed that most less literate adults have followed the oral language development sequence in the developmental model, and that they have acquired extensive oral language vocabularies and large amounts of conceptual knowledge. It is thought that their literacy problems are due mostly to their failure to learn how to "break the code" of written language. In this case, then, the simple and expeditious remedy for the problem is to provide a course of instruction in phonics and additional "decoding" skills. Then, once the adult has "broken the code" he or she will be able to bring a vast amount of vocabulary and oral language comprehension skills to bear on reading and understanding the written language.

But the studies of listening and reading indicate that, despite some individual differences, as a trend, less literate adults tend to perform as poorly on tests of spoken language vocabulary and comprehension, when decoding written language is not part of the task, as they do on reading tests. Thus, brief tutoring on the decoding of written language will generally not suffice to bring the less literate to the higher levels of literacy being called for today.

The second and third special topics deal with the *intergenerational* relationships of parent's education to the literacy skills of their children and with relationships of literacy to *occupational status* and *job performance*.

Together, data from these three special topics indicate that the less literate adults are likely to be low in both oral and written language competence, and that their children tend not to achieve at the higher levels of literacy, even though they may complete education at the high school level or beyond. Further, as children grow up to become the less literate adults, the more likely they are to be found in the lower status occupations, and in many instances, the least literate will not perform job tasks as well as the more highly literate.

One of the most disconcerting findings from the study of literacy and occupational status is that African-American *college graduates* performed Prose, Document and Quantitative literacy tasks at a level of skill below that of the typical clerical worker in the nation (page 137). Only 20 percent of African-Americans of any education level exceeded the average literacy levels of clerical workers (page 136). This suggests serious occupational access problems for African-Americans in the future.

Part III: Testing of Adult Literacy Development in Education Programs

Part III of the Compendium moves from the assessment of the literacy skills of adults to the assessment of literacy skill *development* in adult literacy programs. It presents a summary of the gains that adult literacy students have made in a wide variety of adult literacy programs across the nation. Numerous scores on standardized tests given at the beginnings of literacy programs are presented (called "pre-test" scores), along with scores made later on in the program or at the end of a program (called "post-test" scores). Limited data are presented for adults who were tested three or four times for up to three years.

Generally, the data from these program assessments indicate that, on average, adults achieve about one-half to one-and-a-half "years" of gain in a wide variety of programs. This gain is not influenced much by the entering level of skill of the students or the number of hours of instruction between pre- and post-tests.

The data for students who were repeatedly post-tested three or more times in longitudinal studies indicate that little improvement occured after the first post-test. Why this is so is not knowable from the data presented. But , in part, it may reflect a failure on the part of adult learners to engage in sufficient literacy practice, either in or out of programs, to develop the extensive bodies of knowledge needed to move up the scale from lower to higher levels of literacy.

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PART I

PART I

ASSESSING ADULT LITERACY SKILLS

MILITARY ORIGINS OF GROUP LITERACY TESTING

TESTING OF ADULT LITERACY IN THE CIVILIAN SECTOR

MILITARY ORIGINS OF GROUP LITERACY TESTING

Data are presented for military assessments during World War I (1917-1919), the World War II era (1940's), the Korean War era (1950's), Vietnam era (1960's) and the present, volunteer military service era (1970's to 1990's). Aside from the World War I tests of "intelligence," the military's tests of "aptitude" have looked very similar for the last half century. There have always been vocabulary and mathematics tests of some sort in the military's aptitude tests. These have been used to indicate "verbal" and "quantitative" "aptitudes". At various times, there have been tests of spatial perception, tool recognition, and mechanical comprehension to detect special aptitudes.

Overview of Military Tests

For over 75 years, the armed forces have pursued a policy of assessing the mental ability of adults who are eligible for military service. In World War I, some 1.9 million men were tested on the Army Alpha test of intelligence for literates, and the Army Beta test of intelligence for illiterates and non-English speakers.

Over the years, the mental ability tests used by the armed services have changed in content and in the definition of what they measure (see Table 1, p. 18), but they still represent attempts to assess the cognitive skills of adults and to use that information to select people for military service and to assign them to work for which their "aptitudes" suit them.

For the present report, four major periods in the history of military mental testing (Table 1) are considered. The first witnessed the introduction of mental testing during World War I. The second occured during World War II, when the first large-scale, operational use was made of mental tests for *classifying* recruits into job assignments. Separate tests were used by the Army and the Navy. The third major period occured in the 1950s, when the Armed Forces Qualification Test (AFQT) was specially designed and developed to serve as a test for *screening out* low mental ability persons for all military services. The AFQT subtest scores were then combined with other tests, which differed for each service, to classify recruits into job assignments. The fourth period in military mental testing began in 1976, during the All Volunteer Force, when the Armed Services Vocational Aptitude Battery (ASVAB) was introduced as the single test battery to be used by all military services for both screening and job classification.

In Table 1, only the four subtests of the ASVAB that make-up the AFQT that is used for screening for military service are shown. Additionally, the ASVAB includes six other subtests that assess special knowledge or skill (Electronics Information; Mechanical Comprehension; Automotive and Shop Information; Coding Speed; General Science; Numerical Operations). The special knowledge subtests are combined with subtests from the AFQT to form ASVAB composites for classifying military applicants into job fields for which the military has determined their aptitudes suit them best. For instance, all four military services use an electronics composite made-up of Arithmetic Reasoning + General Science + Mathematics Knowledge + Electronics Information. The different services weight each subtest score differently in combining them into one composite score.

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Thomas G. Sticht (1992, October) see p. 13 of Compendium for full citation.

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TABLE 1 Tests Used by the Military for Assessment of Cognitive Skills From World War I to the Present

Test	Historical Period Used	Dates Used	CONTENT
Army Alpha	WWI	1918	Oral directions, arithmetical problems, practical judgment synonyms-antonyms; disarranged analogies, information.
Army Beta	WWI	1918	Maze, cube analysis, O-series, digit symbol, number checking, pictorial completion, geometrical construction.
Army General Classification Test (AGCT)	WWII	1941-1945	Verbal, arithmetic computation, arithmetic reasoning, pattern analysis.
Armed Forces Qualification Test (AFQT)	Post-WWII	1950-1952	Word knowledge, arithmetic reasoning, spatial relationships.
	Korean War / Vietam War	1953-1973	Word knowledge, arithmetic reasoning, spatial perception, tool recognition.
Armed Services Vocational Aptitude Battery (ASVAB-AFQT)	All-Volunteer Force	1976-1980	Word knowledge, arithmetic reasoning, spatial relationships, mechanical comprehension.
		1980-1988	Word knowledge, arithmetic reasoning, paragraph comprehension, numerical operations.
		1988-Present	Word knowledge, arithmetic reasoning, paragraph comprehension, mathematics knowledge.

Sources: Sticht, 1992, p. 13; Wigdor & Green, 1991, p. 50.

The Alpha and Beta Tests of World War I

The first mental tests designed to be used for mass, group testing were developed by psychologists for the U.S. Army in 1917-1918. The group tests were modeled after intelligence tests designed for individual use in one-on-one assessment. In developing the mental tests, the psychologists subscribed to the position that one could be quite intelligent, but illiterate or not proficient in the English language. Based on this reasoning, two major tests were developed, the Army Alpha for literate groups, and the Army Beta for illiterates, low literates or non-English speaking (Yerkes, 1921). Both tests were based on the theoretical position that intelligence was an inherited trait, and the assumption was made that *native intelligence* was being assessed. Each test was made-up of a number of subtests (Figure 4, p. 24), the contents of which differed depending on whether the test was for literates or illiterates, low literates or non-English speakers.

Results

Figure 3, p.23 shows the results of assessments with the Alpha and Beta tests for several special studies. These results show trends that have persisted up to the present time with national assessments. First, for both the Alpha and Beta tests, scores generally increase as years of education increase. Second, whites exceed blacks at all levels of education. Third, scores for Northern blacks exceed those of Southern blacks.

As mentioned earlier, the fact that poorly educated Officers performed well on the Alpha test was interpreted as indicating that the Alpha measured native intelligence. However, careful examination of the types of items that made-up each subtest suggests that literacy practices may have been higher among the Officers and this may have led to their improved performance on the Alpha test.

The Alpha Test

As indicated in Figure 4, p. 24, the Alpha test battery for literates included a wide range of tests of knowledge and various cognitive skills. Using the simple model of the human cognitive system given in Figure 1, p. 4, the Alpha test can be reinterpreted not as a test of native intelligence but as a sampling of a wide variety of cognitive abilities by addressing the person's knowledge base by both oral language and written language.

Test 1: Following Oral Directions, involves auding and comprehending simple or complex oral language directions and looking at and marking in the appropriate places on the answer sheet. To a large extent, this is a test of the ability to hold information in working memory and to combine earlier instructions with later ones to determine the correct marking responses.

The role of special bodies of knowledge in the performance of information processing activities is clearly illustrated in the remaining tests.

Test 2: Arithmetical Problems, requires both the ability to read and comprehend the stated problem and the knowledge of arithmetic to perform the computations called for. Again, working memory is stressed by having to hold more than one phrase in it that is information bearing, then combining the phrases and performing the required computations. Mathematics knowledge is also required for Test 6.

Test 3: Practical Judgment, clearly requires reading and comprehending language. Additionally, however, it requires knowledge of cuturally, normative expectations to make the "correct" choice. In terms of the developmental model of literacy, this means that the person's mind would have had to develop in an external context or environment in which the information needed to make the normatively "correct" response would be presented in some form.

Test 4: Synonyms-Antonyms, requires specific vocabulary knowledge, in addition to the knowledge of "same" and "opposite."

Test 5: Disarranged Sentences, requires semantic knowledge about flies as well as grammatical knowledge to rearrange the sentences, and information has to be held in working memory while rearranging the sentences.

Test 6: Number Series Completion, emphasizes reasoning with number knowledge in working memory.

Test 7: Analogies, clearly emphasizes culturally determined, semantic knowledge retrieval from the long term memory knowledge base, and also information processing in working memory to detect similarities among the different knowledge domains addressed by the analogies.

Test 8: Information, is heavily loaded with cultural knowledge requirements. It is a probe of the person's knowledge base to discover the extent to which it includes both very familiar and less familiar declarative knowledge available in the United States' culture.

To determine each person's intelligence level, scores for all eight subtests were combined into one total score. The correlation of Alpha total scores with Stanford-Binet mental age was .81 (Yerkes, 1921, p. 634, table 155).

Based on a person's total Alpha score he was assigned a letter grade of A (superior intelligence), B, C+, C (average intelligence), C-, D, or D- (inferior intelligence). The letter grade became the person's mental category, and was taken as a general indicator of the person's native intelligence. This position was held even though there was a clear relationship of Alpha scores to years of schooling, in which much of the special knowledge, vocabulary and cultural knowledge would have been developed. Correlations of subtest scores with education were found in one special study to range from .51 for Test 3 (Practical Judgment) and years of schooling to .68 for Test 4 and years of schooling, when low literates and non-English speaking were excluded. With low literates included (but not non-English speaking), these correlations ranged from .60 for Test 7 (Analogies) to .74 for Test 2 (Arithmetic) and years of schooling (Yerkes, 1921, p. 781, Table 326). Generally, the correlations of Alpha *total* test scores with education ranged from .65 if the low literates and non-English speaking were excluded to .75 when the latter were included (Yerkes, 1921, pp. 779-780).

Rather than regarding the Alpha scores as reflecting the results of literacy practices and years of schooling, the test developers considered that the years of schooling completed reflected the results of the native intelligence measured by the Alpha tests (Yerkes, 1921, p.783).

The Beta Test

In determining who should take the Beta test, decisions were made frequently in terms of the number of years of education reported. Generally, those with fewer than four, five, or six years of education were sent to Beta testing. Additionally, men who were non-English speakers, or very poor in speaking English were sent for Beta testing. In some cases, men who tried the Alpha tests but were subsequently judged to be poor readers were readministered the Beta tests. The procedures were not uniform across the testing locations.

As shown in Figure 4, p. 24, like the Alpha test, the Beta test battery for illiterates, low literates or non-English speakers also used a number of subtests. However, unlike the Alpha test in which instructions were given in oral and written language, the Beta subtest instructions were executed in pantomime by the testor and his aides. The examinees marked their responses on paper using pencils, but they were not required to use written language (though reading of number symbols was required in some subtests). As for the Alpha test, the Beta subtest scores were combined into one score, and that score was used to assign letter grades indicating general intelligence.

Though the attempt was to use the Beta test as an intelligence test comparable to the Alpha but freed of influences of literacy and the English language, examination of the subtests in (Figure 4) reveals major differences between the Alpha and Beta tests both in terms of the knowledge called for and the information processing skills involved in processing graphically presented information.

As noted in the discussion of the developmental model of literacy (Figure 2, p. 6) there are two main aspects to literacy. On the one hand, literacy involves the use of graphics technology to produce a second signaling system for speech. That is, the written language is a graphical representation of the spoken language to a large degree.

However, the second major aspect of literacy is the use of the elements of graphics technology - light, space, and permanence - to produce graphic devices to be used in information processing for problem solving, reasoning, and communicating. In the subtests of the Beta test, it is clear that literacy as the use of graphics technology for problem solving and reasoning is included in every subtest.

Test 1: Maze, requires looking at the graphically represented maze while reasoning about the path to be taken.

Test 2: Cube Analysis, requires counting cubes in the graphic representation and this combines the use of graphics information with knowledge of the language of arithmetic for counting

Test 3: X-O Series, requires reading graphic displays in left to right sequences while reasoning in working memory.

Test 4: Digit Symbol, requires scanning the upper number and graphic symbols, holding them in working memory while scanning the lower numbers and then producing the appropriate mark to match the graphic symbol to the number.

Test 5: Number Checking, is similar to Test 4 in requiring scanning and matching of graphic symbols, this time in numeric forms.

Test 6: Picture Completion, clearly involves the scanning of graphic displays and the knowledge of the depicted objects to complete the picture.

Test 7: Geometrical Construction, involves studying in working memory the graphics information on the left and mentally rearranging it to construct the figure on the right.

From the foregoing analysis, it becomes clear that both the Alpha and Beta assessed cognitive skills with the concomitant use of literacy. That is, the ability to utilize graphic marks arrayed in various designs for information processing is common to both tests. The primary difference between the two tests is that the Alpha requires extensive reading defined in the developmental model as looking while languaging, while this is not required to any significant degree in the Beta test (though reading the letters and numbers of Tests 3, 4 and 5 permits some reading while languaging).

In turn, languaging of sentences requires the retrieval of semantic information from the knowledge base stored in long term memory to be used in working memory for comprehending the information being picked-up from the graphic display in the text of the test. In the Beta test, on the other hand, most of the information processing could be done in working memory without the need to locate and retrieve semantically encoded knowledge from the long term memory.

Intercorrelations among the Beta subtests ranged from a low of .41 for subtests 1 (Maze) and 5 (Number Checking) to a high of .75 for subtests 5 (Number Checking) and 4 (Digit Symbol). Perhaps the relatively high correlation of .75 for subtests 4 and 5 reflects the fact that both make extensive use of number reading (Yerkes, 1921, p. 155, Table 634).

The intercorrelations among the Alpha and Beta subtests that were obtained for the sample of men who first took the Alpha and then were referred for Beta testing ranged from a low of .36 for Beta test 2 (Cube Analysis) with Alpha test 3 (Practical Judgment) to a high of .68 for Beta test 4 (Digit Symbol) with Alpha test 2 (Arithmetical Problems) (Yerkes, 1921, p. 634, Table 155). These are quite a bit lower than the correlations in the range of .59 to .86 for intercorrelations among the Alpha tests given above.

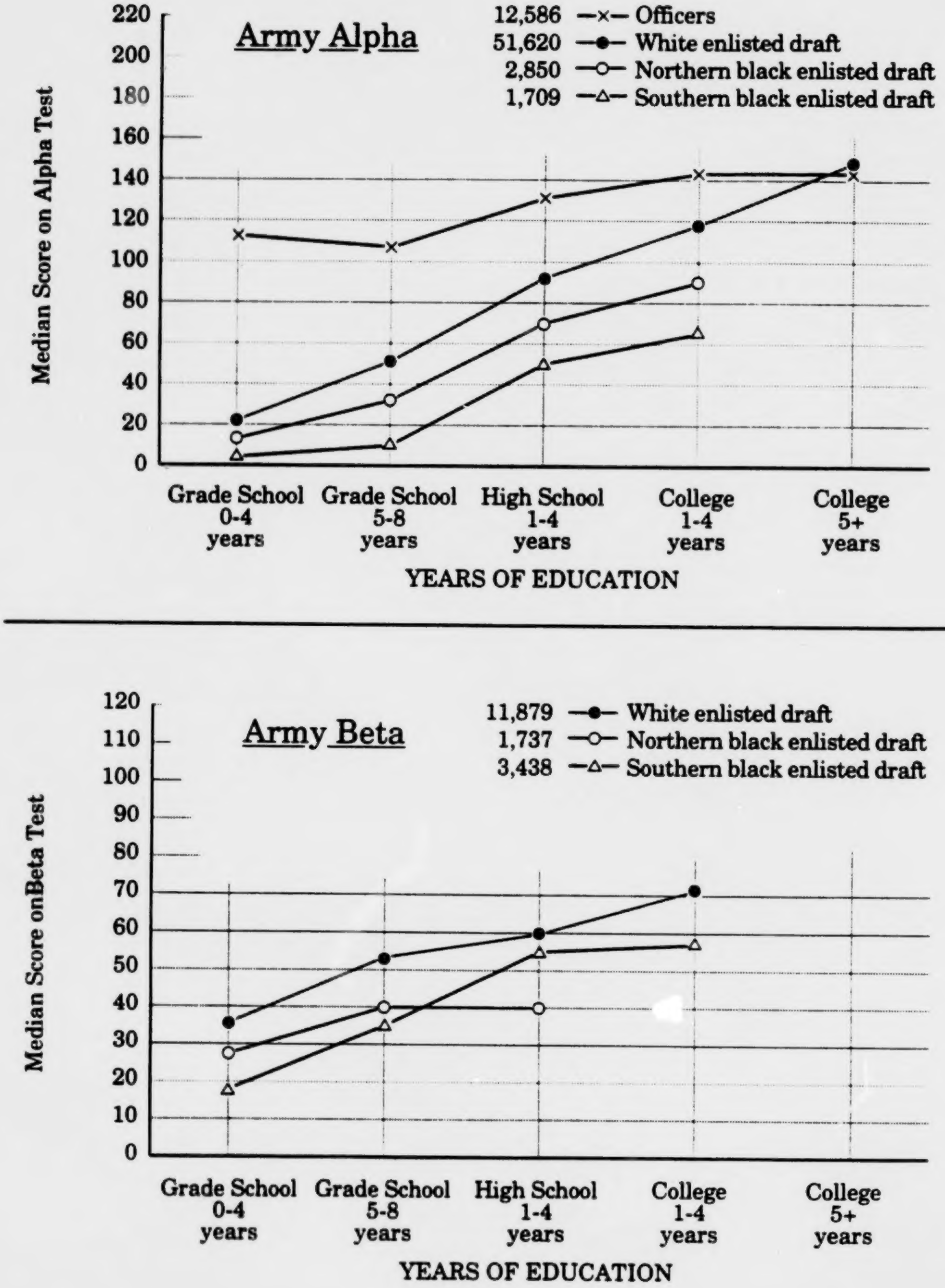
The correlation of Beta total scores with schooling ranged from .45 for a sample of over 11,000 native born men with education levels ranging from none to college, to .67 for a sample of 653 native-born draftees (Yerkes, 1921, p. 781, tables 327, 328). For a sample of 5,803 foreign born the correlation of Beta total score with schooling was .50. In general, then, the correlations of Beta scores with years of schooling were lower than the correlations of Alpha scores and education (.75) when the full range of Alpha test takers (including those subsequently sent for Beta testing) was included.

When the Alpha and Beta test total scores (excluding non-English speakers) were correlated with mental age scores on the Stanford-Binet individually administered intelligence test, the resulting coefficients were .81 and .73, respectively. Since the Stanford-Binet is essentially an auding test, in which the administrator speaks the questions and the given information, it is perhaps to be expected that the correlation between the heavily language-laden Alpha and Stanford-Binet tests would be greater than the very low language-based Beta test with the Stanford-Binet. For a sample of 653 recruits, the correlation of Stanford-Binet with years of schooling was .65 (Yerkes, 1921, p. 782, Table 330).

Reference

Robert M. Yerkes (1921). *Psychological Examining in the United States Army. Memoirs of the National Academy of Sciences, Vol. XV.* Washington, DC: U.S. Government Printing Office.

FIGURE 3 | **ALPHA / BETA MEDIAN SCORES**



Source: Robert M. Yerkes (1921). Psychological Examining in the United States Army. Memoirs of the National Academy of Sciences, Vol. XV. Washington, DC: U.S. Government Printing Offices, pp.766-771.

FIGURE 4 | **ALPHA / BETA TESTING**

ARMY ALPHA

Test for Literates

Test 1 Following Oral Directions.

"When I say 'go,' make a cross in the first circle and also a figure 1 in the third circle."

⊕ O ① O O O

Test 2 Arithmetical Problems

Ex: If it takes 6 men 3 days to dig a 180 - foot drain, how many men are needed to dig it in half a day. Answer: (36)

Test 3 Practical Judgment

If a man made a million dollars, he ought to
- [ ] Pay off the national debt
- [x] Contribute to various worthy charities
- [ ] Give it all to some poor man

Test 4 Synonyms - Antonyms

Samples:		
	good - bad	same - opposite
	little - small	same - opposite

Test 5 Disarranged Sentences

leg flies one have only   true - false

Test 6 Number Series Completion

2   3   5   8   12   17   23   30

Test 7 Analogies

gun - shoot: : knife - run cuts hat bird

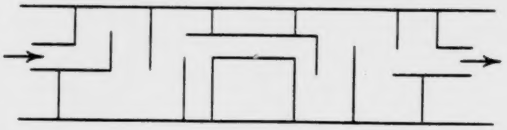
Test 8 Information

The Wyandotte is a kind of:
horse fowl cattle granite

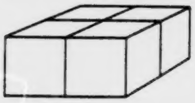
ARMY BETA

Test for illiterates and foreign language speakers.

Test 1 Maze. Credit for correct tracing of mazes.



Test 2 Cube Analysis. Correct count of cubes.

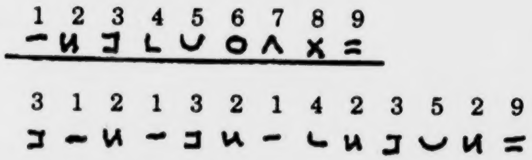


4

Test 3 X - O Series. The series is to be carried out to the end of the line.

X O X O X O X O X O X O

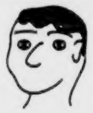
Test 4 Digit Symbol. The appropriate symbol is to be written under each number.



Test 5 Number Checking. Correct response indicated.

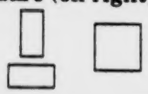
699310 . . . . X . . 699310
251004818 251004418

Test 6 Picture Completion. Identify missing parts.



(mouth missing)

Test 7 Geometrical Construction. Construct a square (on right) out of figures on left.



The Army General Classification Test Of World War II

As the United States moved into World War II, the Army developed new mental tests to aid in the classification of recruits into jobs. At the time that the Army General Classification Test (AGCT) was developed, psychologists in the military personnel research sections considered that "intelligence tests do not measure native mental capacity. They measure actual performance on test questions. A test is a fairly valid measure of the native capacities which underlie the abilities tapped by its questions when every one tested has had equal opportunity and equal incentive to develop the abilities measured" (Zeidner & Drucker, 1983, p. 34).

As interpreted by Zeidner & Drucker (1983), both long time members of the Army's personnel research activity, "the Army psychologists' World War II position was that the test scores represented nothing more than an index of measured abilities at the time the test was taken" (p. 35).

The purpose of the AGCT was to serve as a measure of "general learning ability" that could be used to assign new recruits to jobs.

The AGCT Test

As indicated in Figure 5, p. 26, the Army General Classification Test (AGCT) included four subtests:

The Vocabulary Test, required knowledge to select the correct response regarding the meanings of words in the person's long term memory.

The Arithmetic Test, required knowledge of mathematics as well as language-based knowledge to comprehend the words in the word problems.These types of problems are heavily dependent on efficiency of information processing in working memory, too.

The Block-Counting Test, emphasized the use of literacy as graphics display processing and required visualization to imagine the presence of obscured blocks.

Because the Army of World War II had to draw upon a primarily inexperienced young adult population and train recruits in a wide variety of technical and administrative fields, as well as mechanized combat jobs, the AGCT was validated as a classfication instrument by correlating scores on AGCT with grades in training courses. This seemed consistent with the interpretation of the AGCT as a measure of "general learning ability." Indeed, in content, the AGCT (Figure 5, p. 26) resembled measures of schooling, such as reading vocabulary ("verbal" ability) and arithmetic computation and word problem solving . Only a measure of "spatial analysis" was included that differed from school-based achievement tests. Given that the AGCT so much resembled a measure of past school learning, it is not surprising that it was found to correlate reasonably well with achievement in Army schools.

As in World War I, scores on the subtests of the AGCT were combined into a total score, and recruits were assigned to "grades" based on their total scores. High scoring recruits, "rapid learners" were assigned to Army Grade I, next highest were Grade IIs, then "average learners" in Grade III, "below average" in Grade IV, and "slow learners" were assigned to Army Grade V. With the Selective Service Act of 1948, an entire mental category, Army Grade V, comprised of some 8 percent of the young, white, male population, was excluded from service (Wool, 1968, p.66). This was the first time that a statutory mental (literacy?) standard was set for military service.

References

Joseph Zeidner and Arthur J. Drucker (1983). *Behavioral Science in the Army: A Corporate History of the Army Research Institute*. Alexandria, VA: U. S. Army Research Institute for the Behavioral and Social Sciences.

Harold Wool (1968). *The Military Specialist: Skilled Manpower for the Armed Forces*. Baltimore, MD: The Johns Hopkins Press.

FIGURE 5

World War II
Army General Classification Test - AGCT

Sample Vocabulary, Arithmetic, and Block-Counting Items from AGCT-la.

31. AGE means most nearly (A) person (B) school (C) bread (D) time

32. A STAVE is made of (A) thread (B) wood (C) jelly (D) grass

33. To SQUABBLE is to (A) float (B) sing (C) dispute (D) speak

34. A THUD is a (A) nut (B) bolt (C) sound (D) light

35. VIOLENT means most nearly (A) modern (B) dead (C) fierce (D) better

36. Bill has 6 dollars, Jack has 8 dollars, and Henry has 4 dollars. How many dollars do they have altogether?
(A) $16 (B) $14 (C) $17 (D) $18

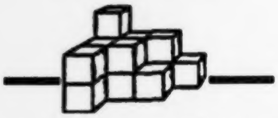
37. A man attended target practice 9 times. He scored 189 in all. What was his average score for each time?
(A) 18 (B) 21 (C) 24 (D) 27

38. Six men went on a trip by automobile. The total expense was $13.44, which was shared equally. How much was each man's share of the total expense?
(A) $2.24 (B) $2.56 (C) $2.92 (D) $3.24

39. Men start work at 8:30 in the morning and quit at 12:00 noon. How many hours do the men work in the morning?
(A) 2 1/2 (B) 3 (C) 3 1/2 (D) 4

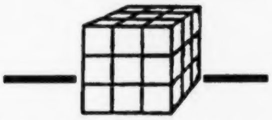
40. A camp has 186 men in three equal groups. How many men are in each group?
(A) 62 (B) 93 (C) 33 (D) 59

41. How many blocks?



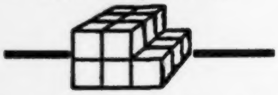
(A) 10 (B) 8 (C) 15 (D) 12

44. How many blocks?



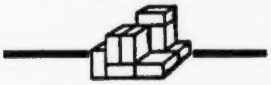
(A) 18 (B) 24 (C) 19 (D) 27

42. How many blocks?



(A) 14 (B) 11 (C) 15 (D) 16

45. How many blocks?



(A) 9 (B) 10 (C) 11 (D) 12

Source: Zeidner, J. & Drucker, A. (1983, March). Behavioral Science in the Army: A Corporate History of the Army Research Institute. Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences. (p. 27).

The Armed Forces Qualification Test (AFQT)

In 1950, the Armed Forces Qualification Test (AFQT) was introduced as the single test that would be used to screen draftees and volunteers for entry into any of the armed services. With some changes in content (Table 1, p. 18), the AFQT has remained as the primary screening test for military service through the Korean and Vietnam Wars, and up to the present. As noted by Eitelberg, et. al (1984, p. 16). In developing the AFQT, care was taken to make certain that speed was not emphasized, so that slow workers would not be penalized, and that the verbal instructions were not so difficult as to obscure the test items themselves. In these ways, the test was designed to be especially useful for distinguishing among the least able.

The 1950 AFQT Subtests (Figure 6, p. 28)

The Vocabulary test, involves the retrieval of information in the form of word meanings from the long term store of knowledge, and selecting the correct multiple choice alternative.

The Arithmetic test, involves mathematics knowledge, semantic word meaning knowledge and the processing of information for problem solving in working memory.

The Block-Counting test, involves visualizing missing information in graphic displays in working memory.

The Spatial test, involves reasoning in working memory while studying graphic displays of visual patterns.

The 1953-1973 AFQT Subtests (Figure 7, p. 29)

The AFQT for 1953-1973 retained Vocabulary, Mathematics, and Spatial subtests similar to those of the 1950 test. But the Clock-Counting test was dropped and a new Mechanical Ability test was added.

The Tool Recognition test, required knowledge in long term memory of automotive and other shop tools for completion.

Findings

In practice, the scores on each of the AFQT subtests were combined into a single score and distributions were matched to the World War II distributions of examinee scores on the Army General Classification Test (AGCT). Then, as with the Army Alpha and Beta tests, and the AGCT, the total scores were grouped into "mental categories."

In 1968, an article in American Education, published by the U. S. Department of Health, Education and Welfare, reported distributions by mental categories for Whites and Blacks.

Table 2. Estimated Percentage of Draftees
by Mental Group, by Race: FY 1966

Mental Group	Whites	Blacks	Total
I	7.6	0.3	6.7
II	32.1	3.3	28.8
III	34.6	18.2	32.8
IV	16.0	38.2	18.5
V	9.1	37.1	12.3

Source: R. de Neufville & C. Comer (1968). *How good are our schools? Armed Forces Qualification Test Provides a Clue.* American Education, p. 7.

On June 30, 1951, Congress passed Public Law 51 establishing the minimum acceptable standard for entry into military service at the 10th percentile, hence excluding persons in AFQT mental category V from service (Maier & Sims, 1986, A-14).

References

Mark Eitelberg, Janice Laurence, Brian Waters, and Linda Perelman (1984). *Screening for Service: Aptitude and Education Criteria for Military Entry.* Alexandria, VA: Human Resources Research Organization (p. 16).

Milton Maier and W. Sims (1986, July). *The ASVAB Score Scales: 1980 and World War II.* CNR 116.

FIGURE 6 ARMED FORCES QUALIFICATION TEST - AFQT - 1950

Sample Vocabulary, Arithmetic, Block-Counting, and Spatial Items from AFQT-la.

30. The tie was not appropriate.
    (A) attractive
    (B) expensive
    (C) necessary
    (D) suitable

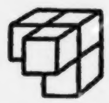
31. He was bewildered.
    (A) angry
    (B) anxious
    (C) confused
    (D) disgusted

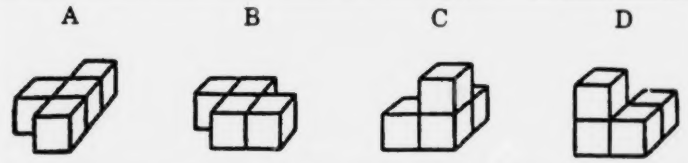
32. Food supplies were abundant on the island.
    (A) available
    (B) limited
    (C) plentiful
    (D) scarce

37. If a boat carries 24 times as much as a plane, how many planes are needed to carry the goods from 6 such boats?
    (A) 204
    (B) 144
    (C) 6
    (D) 4

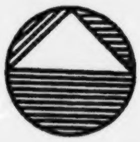
38. If railroad fares are increased 20%, how much more will you pay on a $15.00 ticket?
    (A) $3.00
    (B) $2.00
    (C) $1.50
    (D) $ .75

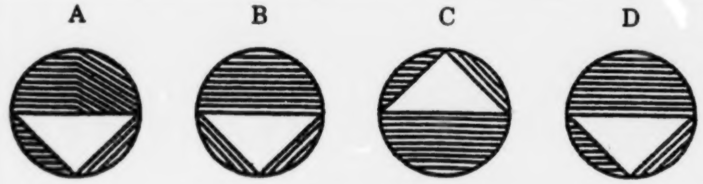
21. QUESTION





22. QUESTION





Source: Zeidner, J. & Drucker, A. (1983, March). Behavioral Science in the Army: A Corporate History of the Army Research Institute. Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences. (p. 51).

FIGURE 7 | **ARMED FORCES QUALIFICATION TEST - 1953-1973**

Vocabulary, Mathematics, Mechanical Ability, Spacial Relationship Subtests of the AFQT for 1953-73.

Vocabulary

There will be be variable winds.

A) shifting
B) chilling
C) steady
D) mild

He is a man of great vigor.

A) wickedness
B) strength
C) reputation
D) wisdom

Mathematics

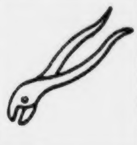
If 12 men are needed to run 4 machines how many men are needed to run 20 machines

A) 24
B) 48
C) 60
D) 80

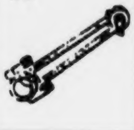
During one year the fruit crop was 500 bushels. The next year the crop increased 102 percent. How many bushels were produced in both years?

A) 510
B) 602
C) 1,010
D) 1,510

Mechanical Ability



A



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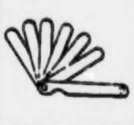

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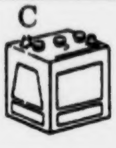

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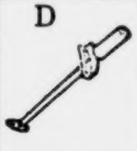
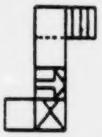
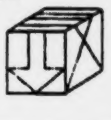


Spacial Relationships



A



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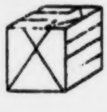

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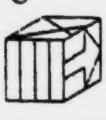
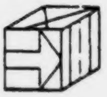


D



Source: De Neufrille, R. & Conner, C. (1966, October). How good are our schools? Armed Forces Qualification Test Provides a Clue. American Education, p. 7.

Armed Services Vocational Aptitude Battery (ASVAB)

In 1973, the draft was ended and the nation entered the contemporary period in which all military recruits are volunteers. Three years later, in 1976, the Armed Services Vocational Aptitude Battery (ASVAB) was introduced as the official mental testing battery used by all services (Table 1, p. 18). The ASVAB combined the AFQT and special aptitude tests that differed for the services into one battery that today includes 10 subtests.

In 1980, the ASVAB was normed on a representative sample of some 12,000 young adults aged 16 to 23. Figures 10-14, (pp.35-39) show sample, simulated items similar to those in each of the 10 subtests of the ASVAB. The figures are based on analyses in which all subtest scores were converted to standard scores on a common scale with a mean of 500 and a standard deviation of 100. The items in the figures are positioned at points on the scale where the probability is 50 percent that persons with that score will correctly answer the item (Bock & Moore, 1984, p. 76). This format makes it possible to compare scores across the different subtests.

Findings

Technological Literacy Levels of Young Adults. Data from the 1980 norming study are summarized in Figure 8, p.33. Because the ASVAB includes extensive assessments of technical knowledge from science, electronics, etc., Figure 8 is sublabled as "Technological Literacy" levels of young adults.

If the figure is read from right to left, it is apparent that females out perform males on the speeded tests of Coding Speed and Numerical Operations, and on Paragraph Comprehension. The sexes are about equal on Word Knowledge and then they start to diverge, with males performing better as the tests move from Mathematics Knowledge, through Electronics Information and General Science information, to the final test, Auto & Shop Information, at which White males out perform White females by some 1.5 standard deviations.

While the same trends for gender hold for Blacks, overall, Blacks perform on the average well below Whites across all subtests of the ASVAB. These data suggest that Blacks in general, and White and Black females in particular will likely be underrepresented in occupations that require technological knowledge backgrounds in the domains sampled in the ASVAB.

Evidence for "Vast Bodies of Knowledge" in Literates. Figure 9 (p. 34) shows correlations among the ASVAB subtests. Reading from left to right, the top figure shows how Paragraph Comprehension correlates with other "general literacy" subtests of Word Knowledge (.80), General Science , Arithmetic Reasoning, Mathematics Knowledge, Numerical Operations and with the more specialized bodies of knowledge in Electronics Information, Coding Speed, Mechanical Comprehension, and Auto & Shop Information (.43).

The bottom figure shows how persons with technical knowledge, such as Automotive and Shop Information, tend also to possess other, related technical domains of knowledge as indicated by the correlations of Auto and Shop Information with Electronics Information (.75), Mechanical Comprehension, and General Science and lower correlations with "general" domains of knowledge.

Together, the positive correlations of Figure 9 reveal that, in general, persons who are knowledgeable in one domain of knowledge are likely to be informed in other domains, too. On the other hand, those low in one domain of knowledge, are likely to be low in others, too. Of course, the correlations are far from perfect, and so there can be considerable shifting around of people in samples of the population. However, it is unlikely that a person at the high end of the scale on Paragraph and Word Knowledge will fall to the low end in Electronics Information or Mechanical Comprehension (though it is possible - just not highly probable).

These findings are consistent with the study of the interrelationships of six major, commercially available reading tests with the AFQT. In that study all of the correlations were in the range from .80 to .95 (Waters, et. al., 1988, p. 46, Table 15). Given the range of the test-retest reliabilities of the reading tests (from .77 to .92), (Waters, et. al., 1988, p. 30, Table 6) these intercorrelations of AFQT and reading test scores are about as high as they can get.

In short, these data suggest that highly literate persons will, by and large, possess vast bodies of knowledge and perform relatively well across a large set of domains of knowledge. Conversely, the least literate will tend to perform uniformly low across these domains of knowledge. This means that if programs of adult literacy are to move students to high levels of literacy, they must assist the person in developing vast bodies of knowledge across a large set of domains of knowledge.

The ASVAB Subtests

Word Knowledge, is a vocabulary test of 35 items that emphasizes knowledge from the long term memory to match stem words with the correct alternative (Figure 10, p. 35).

Paragraph Comprehension, is a reading comprehension test of 15 items that emphasizes knowledge in long term memory and the drawing of inferences in working memory (Figure 10, p. 35).

General Science, is a 25 item test of the knowledge base in various domains of science (Figure 11, p. 36).

Arithmetic Reasoning, 30 items that emphasize reading and mathematics knowledge and processing in working memory (Figure 11, p. 36).

Auto & Shop Information, 25 items testing knowledge of tools, equipment, and procedures used in working with automobiles and other crafts (Figure 12, p. 37).

Mathematics Knowledge, uses 25 items to assess knowledge of content and operations from geometry and other aspects of mathematics (Figure 12, p. 37).

Mechanical Comprehension, a test of knowledge of principles from physics and other sciences with 25 items (Figure 13, p. 38).

Electronics Information, a 20-item test of knowledge of electrical and electronics facts and principles (Figure 13, p. 38).

Numerical Operations, is a 50 item test of how rapidly one can add, subtract, multiply and divide whole numbers. It is rarely entirely completed (Figure 14, p. 39).

Coding Speed, is a speeded, 84-item test in which codes for items given in the stem must be rapidly matched to items in the multiple-choice alternatives. For instance, in the stem, *room* is coded 2864. In the sample question, the number alternative *c* must be circled for the word *room* (at figure14, p. 39).

Four subtests on the ASVAB are combined to form the AFQT. From 1976 to 1980 the AFQT was made up of the subtests of word knowledge, arithmetic reasoning (word problems) spatial relationships (for example, determining what kinds of boxes might result from folding two dimensional drawings), and mechanical comprehension (for example, if a lever is moved on a piece of equipment, what cogs and gears would move and produce a change in the equipment). From 1980 to 1988, the AFQT consisted of word knowledge, paragraph comprehension, arithmetic reasoning, and numerical operations (rapidly adding, subtracting, multiplying and dividing up to two digit numbers; no one completes this speeded test). In 1988 numerical operations was dropped and mathematics knowledge was added.

As with the earlier AFQT, the ASVAB-AFQT is considered as a measure of "trainability." Percentile scores on the AFQT are divided into five categories. Applicants scoring in categories I and II are considered to be "well above average" and "above average" in trainability. Category III represents "average" trainability, while category IVs are "below average." Those scoring in category V are considered "well below average" in trainability, and as mentioned earlier, are excluded by law from military service. In effect, this makes the AFQT the only nationally administered test of basic skills (reading and mathematics) with a Congressionally mandated standard for employment - though it is employment in the armed services (Office of the Assistant Secretary of Defense: (Force Management and Personnel), 1987, pp. II-12 - II-14).

Today, the AFQT and special aptitude subtests of the ASVAB are used both to screen out lower aptitude applicants from military service, and to classfiy applicants according to occupations for which they qualify. As in earlier times, education standards are in effect, and non-high school graduates must have higher AFQT scores than graduates with qualifying special aptitude scores. Alternative diploma holders (high school equivalency; GED) must also have higher AFQT scores than typical high school diploma graduates.

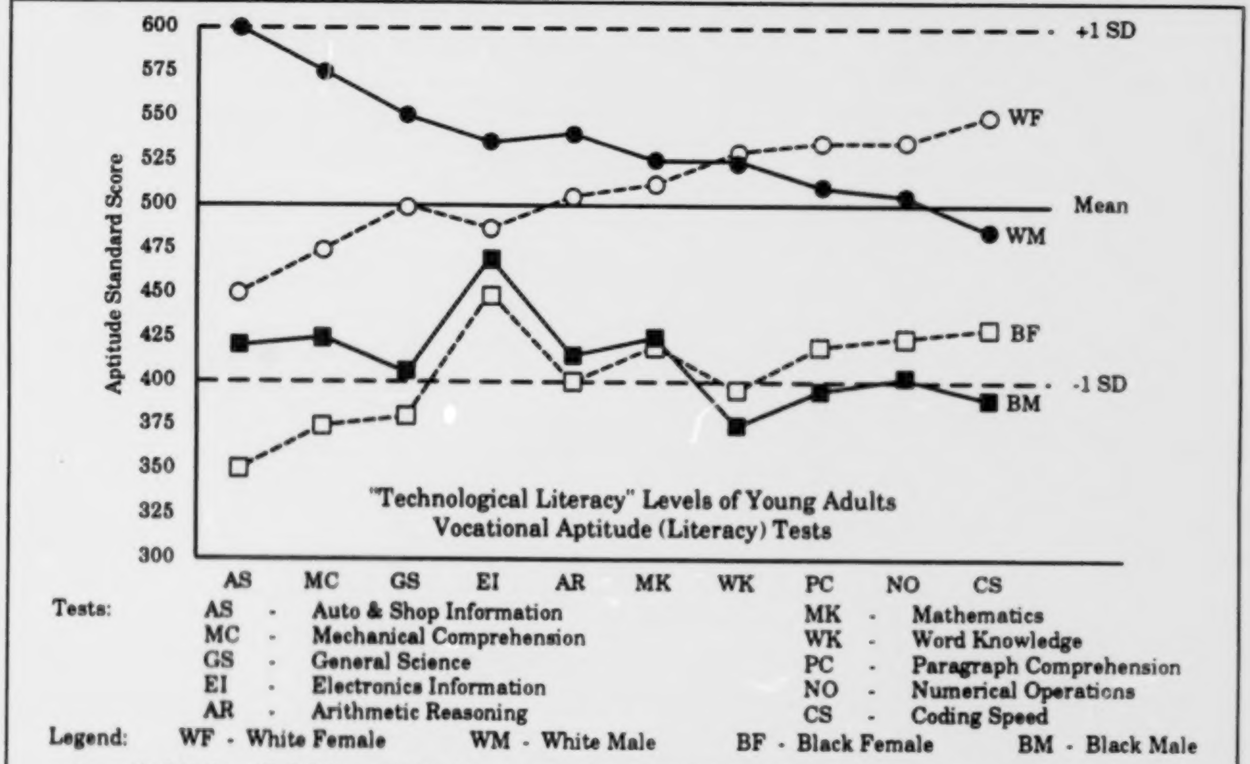
References

R. Darrell Bock and Elsie G. J. Moore (1984, February). *Profile of American Youth: Demographic Influences on ASVAB Test Performance.* Washington, DC: Office of the Assistant Secretary of Defense (Manpower, Installations, and Logistics).

Office of the Assistant Secretary of Defense (Force Management and Personnel). (1987, August). *Population Representation in the Military Services Fiscal Year 1986.* Washington, DC: OASD (FM & P).

Brian Waters, Jeffrey Barnes, Paul Foley, Stephen Steinhaus, and Dianne Brown (1988, October). *Estimating the Reading Skills of Military Applicants: Development of an ASVAB to RGL Conversion Table.* HumRRO Final Report 88-22, FR-PRD-88-22. Alexandria, VA: Human Resources Research Organization.

FIGURE 8 **Armed Services Vocational Aptitude Battery**



Source: Bock, R. D. and E. G. J. Moore (1984, February). Profile of American Youth. Washington, DC: Office of the Assistant Secretary of Defense (Manpower, Installations and Logistics).

FIGURE 9 ASVAB Knowledge Tests

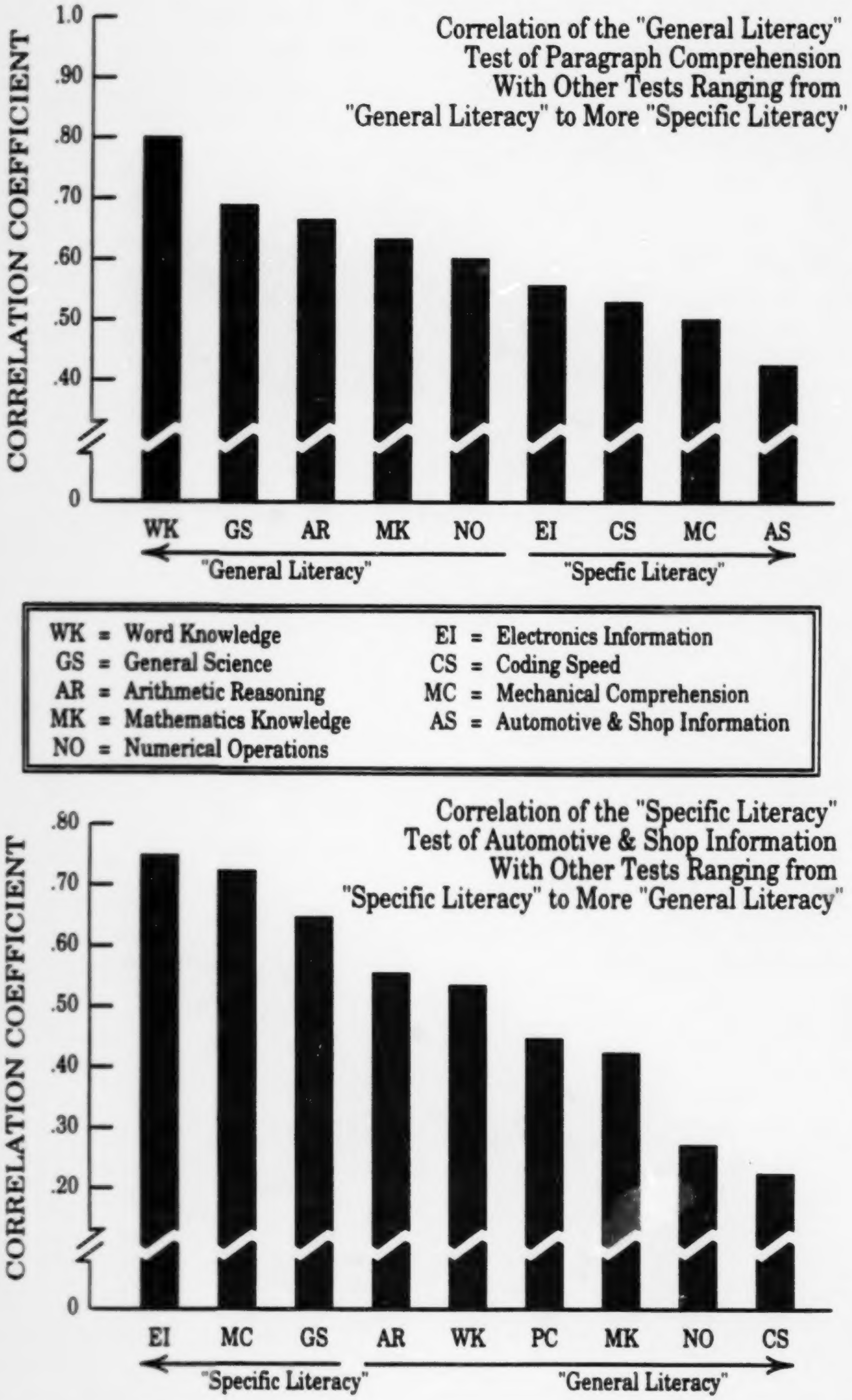
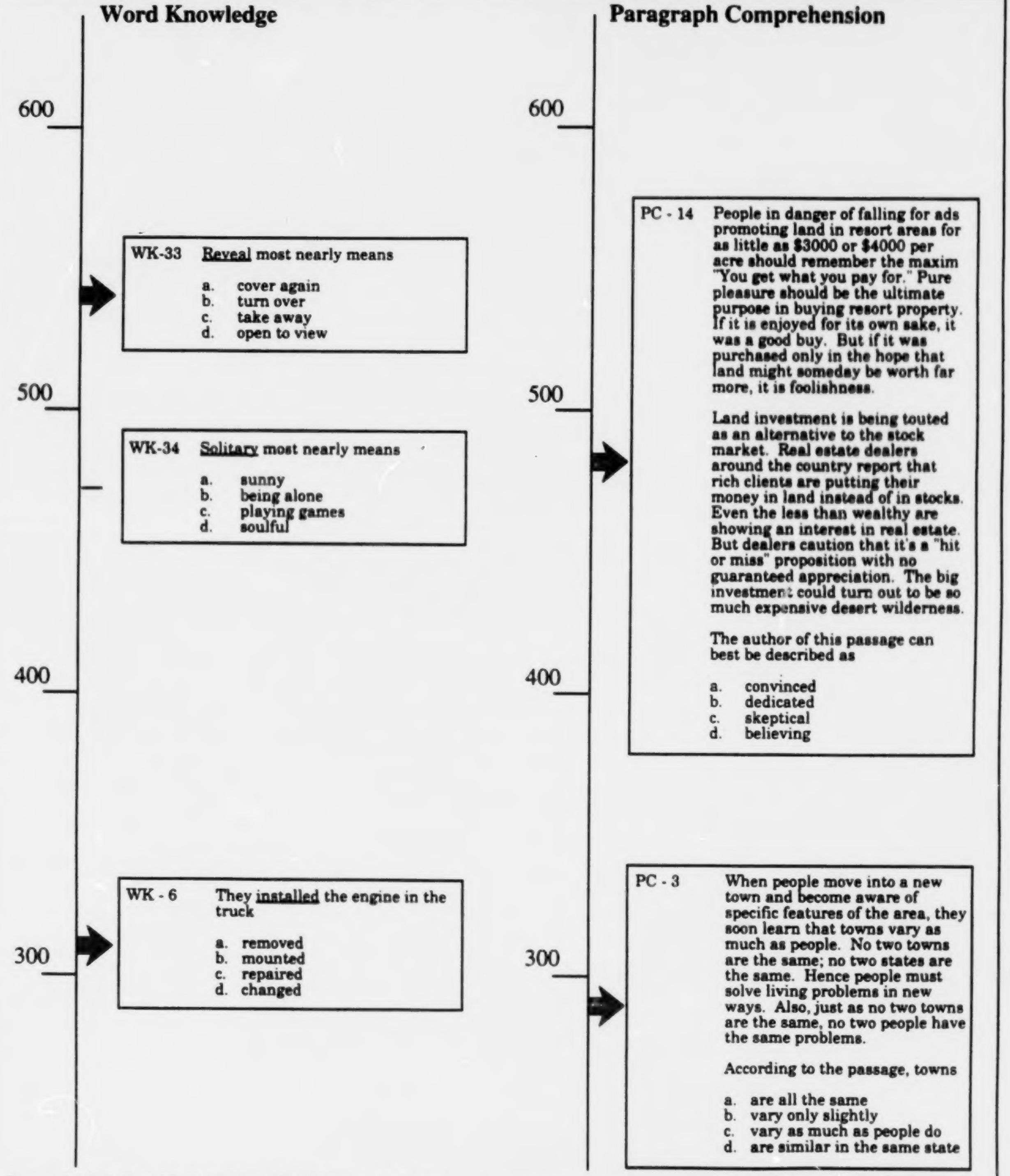


FIGURE 10 Armed Services Vocational Aptitude Battery



WK-33 Reveal most nearly means

a. cover again
b. turn over
c. take away
d. open to view

WK-34 Solitary most nearly means

a. sunny
b. being alone
c. playing games
d. soulful

WK - 6 They installed the engine in the truck

a. removed
b. mounted
c. repaired
d. changed

PC - 14 People in danger of falling for ads promoting land in resort areas for as little as $3000 or $4000 per acre should remember the maxim "You get what you pay for." Pure pleasure should be the ultimate purpose in buying resort property. If it is enjoyed for its own sake, it was a good buy. But if it was purchased only in the hope that land might someday be worth far more, it is foolishness.

Land investment is being touted as an alternative to the stock market. Real estate dealers around the country report that rich clients are putting their money in land instead of in stocks. Even the less than wealthy are showing an interest in real estate. But dealers caution that it's a "hit or miss" proposition with no guaranteed appreciation. The big investment could turn out to be so much expensive desert wilderness.

The author of this passage can best be described as

a. convinced
b. dedicated
c. skeptical
d. believing

PC - 3 When people move into a new town and become aware of specific features of the area, they soon learn that towns vary as much as people. No two towns are the same; no two states are the same. Hence people must solve living problems in new ways. Also, just as no two towns are the same, no two people have the same problems.

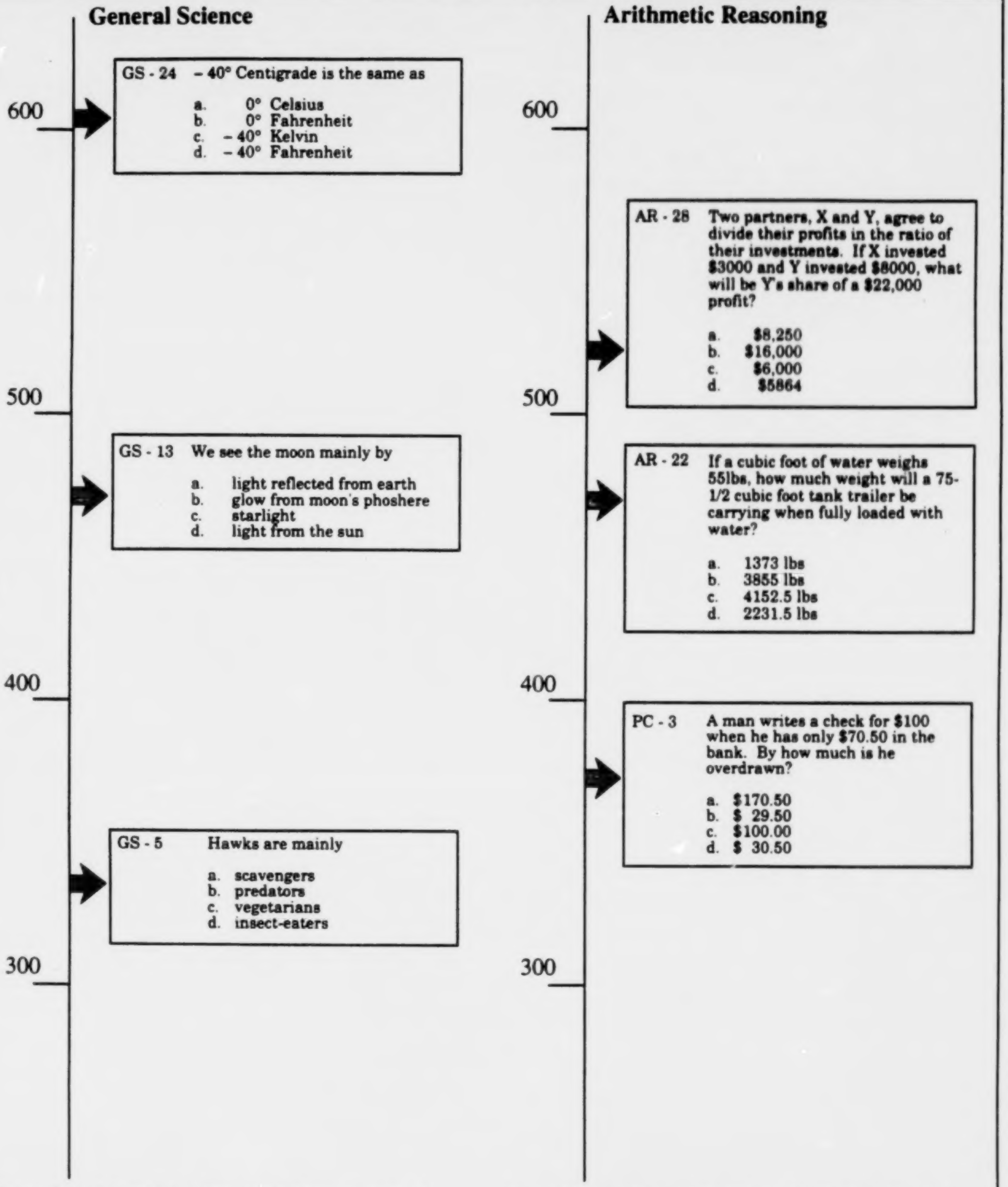
According to the passage, towns

a. are all the same
b. vary only slightly
c. vary as much as people do
d. are similar in the same state

Source: Bock, R. D. and E. G. J. Moore (1984, February). Profile of American Youth. Washington, DC: Office of the Assistant Secretary of Defense (Manpower, Installations and Logistics), 77-81.

Simulated Items at different difficulty levels from the Armed Services Vocational Aptitude Battery (ASVAB Form 8) used in the 1980 renorming of the ASVAB (higher scale number indicates greater difficulty.)

FIGURE 11 **Armed Services Vocational Aptitude Battery**



General Science

GS - 24 − 40° Centigrade is the same as

a. 0° Celsius
b. 0° Fahrenheit
c. − 40° Kelvin
d. − 40° Fahrenheit

GS - 13 We see the moon mainly by

a. light reflected from earth
b. glow from moon's phoshere
c. starlight
d. light from the sun

GS - 5 Hawks are mainly

a. scavengers
b. predators
c. vegetarians
d. insect-eaters

Arithmetic Reasoning

AR - 28 Two partners, X and Y, agree to divide their profits in the ratio of their investments. If X invested $3000 and Y invested $8000, what will be Y's share of a $22,000 profit?

a. $8,250
b. $16,000
c. $6,000
d. $5864

AR - 22 If a cubic foot of water weighs 55lbs, how much weight will a 75-1/2 cubic foot tank trailer be carrying when fully loaded with water?

a. 1373 lbs
b. 3855 lbs
c. 4152.5 lbs
d. 2231.5 lbs

PC - 3 A man writes a check for $100 when he has only $70.50 in the bank. By how much is he overdrawn?

a. $170.50
b. $ 29.50
c. $100.00
d. $ 30.50

Source: Bock, R.D. and E.G.J. Moore (1984, February). Profile of American Youth. Washington, DC: Office of the Assistant Secretary of Defense (Manpower, Installations and Logistics), 77-81.

Simulated Items at different difficulty levels from the Armed Services Vocational Aptitude Battery (ASVAB Form 8) used in the 1980 renorming of the ASVAB (higer scale number indicates greater difficulty.)

FIGURE 12 Armed Services Vocational Aptitude Battery

Auto & Shop Information

600

500

AS - 24 Which of these adjustments is needed for an automobile driven at high altitudes for the first time?

a. decrease concentration of antifreeze
b. adjust mixture in carburetor
c. bleed brake line
d. increase air pressure in tires

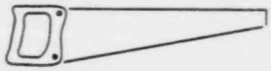
AS - 6 Which of the following mechanical devices is NOT a part of the combustion system of an automobile?

a. piston
b. carburetor
c. brake cylinder
d. fuel pump

400

300

AS - 3



This is the proper saw for

a. cutting a copper pipe
b. mitering a picture frame
c. cutting balsawood on a curve
d. cutting a 2 x 4 in half

Mathematics Knowledge

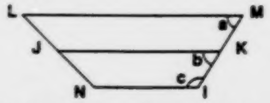
600

MK -23 If j and k are positive whole numbers and $j + k = 12$, what is the greatest possible value of jk?

a. 6
b. 36
c. 32
d. 11

500

MK - 12



In the drawing above, JK is the median of the trapezoid. All of the following are true EXCEPT

a. $LJ = JN$
b. $a = b$
c. $JL = KM$
c. $a \neq c$

400

300

MK - 2 The greatest common factor of 16, 24, and 96 is

a. 8
b. 2
c. 16
d. 12

Source: Bock, R.D. and E. G. J. Moore (1984, February). Profile of American Youth. Washington, DC: Office of the Assistant Secretary of Defense (Manpower, Installations and Logistics), 77-81.

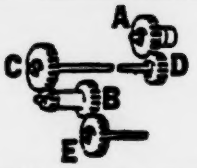
Simulated Items at different difficulty levels from the Armed Services Vocational Aptitude Battery (ASVAB Form 8) used in the 1980 renorming of the ASVAB (higher scale number indicates greater difficulty.)

FIGURE 13 Armed Services Vocational Aptitude Battery

Mechanical Comprehension

600

MC - 23

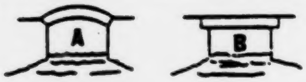


Gear C is on the same shaft as gear D. Two gears that turn in the same direction when the device is turned on are

a. A and C
b. B and C
c. C and E
d. B and E

500

MC - 23

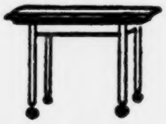


If these two bridges are constructed of the same materials, which will be stronger?

a. B
b. A
c. cannot be determined
d. they are equally strong

400

MC - 2



Casters have been placed on these table legs mainly to

a. make the table higher
b. protect the floor
c. distribute table's weight
d. reduce friction when table is moved

300

Electronics Information

600

EI - 20 Which of the following is measured in watts?

a. electrical power
b. electrical resistance
c. electrical potential

500

EI - 10 If an electric clothes drier fails to reach the proper temperature at a chosen setting, the first thing to inspect is

a. fuse
b. thermostat
c. vent
d. drum rotation

400

EI - 5 Samuel Morse is generally credited with inventing the modern

a. steam engine
b. telephone
c. incandescent light
d. telegraph

300

Source: Bock, R. D. and E. G. J. Moore (1984, February). Profile of American Youth. Washington, DC: Office of the Assistant Secretary of Defense (Manpower, Installations and Logistics), 77-81.

Simulated Items at different difficulty levels from the Armed Services Vocational Aptitude Battery (ASVAB Form 8) used in the 1980 renorming of the ASVAB (higher scale number indicates greater difficulty.)

FIGURE 14 **Armed Services Vocational Aptitude Battery**

Numerical Operations

Now look at the sample problem below.

3 x 3

a. 6
b. 0
c. 9
d. 1

The answer is 9, so the C answer is correct.

Coding Speed

Look at the practice Key and the five sample questions below.

KEY

green	2715	man	3451	salt	4586
hat	1413	room	2864	tree	5972

SAMPLE QUESTIONS	**ANSWERS**				
	A	B	C	D	E
room	1413	2715	2864	3451	4586
green	2715	2864	3451	4586	5972
tree	1413	2715	3451	4586	5972
hat	1413	2715	3451	4586	5972
salt	1413	2864	3451	4586	5972

Source: Bock, R. D. and E. G. J. Moore (1984, February). Profile of American Youth. Washington, DC: Office of the Assistant Secretary of Defense (Manpower, Installations and Logistics), 77-81.

Simulated Items at different difficulty levels from the Armed Services Vocational Aptitude Battery (ASVAB Form 8) used in the 1980 renorming of the ASVAB (higher scale number indicates greater difficulty.)

TESTING OF ADULT LITERACY IN THE CIVILIAN SECTOR

Data are presented for civilian assessments of adult literacy spanning over a half century (Table 3). With the exception of Buswell's study that sampled adults in the Chicago area, the other studies have used a nationally representative sampling of either young adults or the full range of adults.

Starting with Buswell's study in 1937, civilian surveys of literacy skills have gone beyond the assessment of reading and mathematics from an "academic" perspective, like those followed in the military tests, to an approach in which the academic skills of reading and mathematics are applied to the performance of "real life," or "functional" tasks. This includes such tasks as reading movie or TV advertisements, figuring the price of items in a grocery store advertisement, following instructions in recipes, locating information in train schedules, filling out various forms and so forth.

The civilian adult surveys of literacy are also more likely to use open-ended, constructed response items rather than relying solely on multiple-choice items as do the military tests. However, neither this nor the use of "real world" tasks has seemed to have affected major trends in the findings with either military or civilian literacy tests.

Education and Literacy Skill

In both military and civilian literacy assessments, performance is strongly influenced by the amount of formal education the adults have. Higher educated adults perform better than those with medium amounts of education and the latter out-perform the least educated adults. Thus, as a general trend, greater amounts of formal education are associated with greater amounts of literacy skill, i.e., greater ability of adults to perform both "academic" and "functional, real world" tasks. (see Figures 15, p. 43; 30, p. 59; 33, p. 63; 37, p. 67; 68, p. 99; 82, p. 113).

Education and Literacy Practices

As a general trend, as the amount of education goes up, so, too, does the amount of reading and the variety of materials read. Better educated adults read books, magazines, and newspapers more often than do less well educated adults (see Figures 15, p. 43, 33, p. 63, 68, p. 99, 82, p. 113).

Literacy and Ethnicity

On both the military's Armed Services Vocational Aptitude Battery (Figure 8, p. 33) and the National Assessment of Educational Progress's Literacy: Profiles of America's Young Adults, across all levels of education, Whites exceed the performance of African-Americans, and Hispanics fall in between (see Figure 91, p. 137). These are essentially the same findings as with the Army's Alpha and Beta tests in 1917 (Figure 3, p. 23) when the latter was used with non-English speaking recruits as well as with low literates.

TABLE 3 Testing Adult Literacy In Civilian Studies

Study	Year of Study	Subjects of Study	Tests In Assessment
Buswell's Study of Adult Literacy Skills in Chicago	1937	Chicago Area Adults (N=1020)	Reading: Price Lists Telephone Directory Newspaper Movie Ads Paragraph Comprehension Vocabulary Knowledge
National Assessment of Educational Progress	1970	Representative National Sample of Adults 26-35 Years of Age	Understanding Words Reading Graphic Materials Follow Written Directions Using Reference Materials Gleaning Facts from Prose Reading for Main Ideas Drawing Inferences Critical Reading
Harris Survey: Survival Literacy Study	1970	Representative National Sample of Adults 16 Years of Age and Older (N=1,685)	Completing Forms For: Social Security Bank Loans Public Assistance Medicaid Driver's License
Adult Functional Reading Study	1973	Nationally Representative Sample of Adults in Households 16 Years of Age and Older (N=1,537)	Reading Of: Signs, Labels, Forms Periodicals, Books Legal Documents, Letters Notes, Instructions, Listings Advertising
Adult Performance Level Study	1974	Nationally Representative Sample of Adults (N=1537)	Knowledge In: Consumer Economics Occupational Information Community Resources Health, Government & Law Skill In: Communication Computation Problem Solving Interpersonal Relations
NAEP Literacy: Profiles of America's Young Adults	1985	Nationally Repesentative Household Sample of 21-25 Year Olds in the 48 Contiguous States (N=3600)	Prose, Document, & Quantitative Literacy
NALS National Adult Literacy Survey	1993	Nationally Representative Household Sample in 50 States of Adults 16 to 65 + (N=26,000)	Prose, Document, & Quantitative Literacy

Buswell's Study of Adult Literacy In Chicago - 1937

In 1937 Guy Buswell, of the University of Chicago, published the results of studies of reading conducted with some one thousand adults having various years of education who lived in the Chicago area. He developed a battery of tests that measured skills in reading functional materials such as food ads, telephone directories, and movie ads, as well as more traditional "academic" tests of paragraph comprehension and vocabulary knowledge.

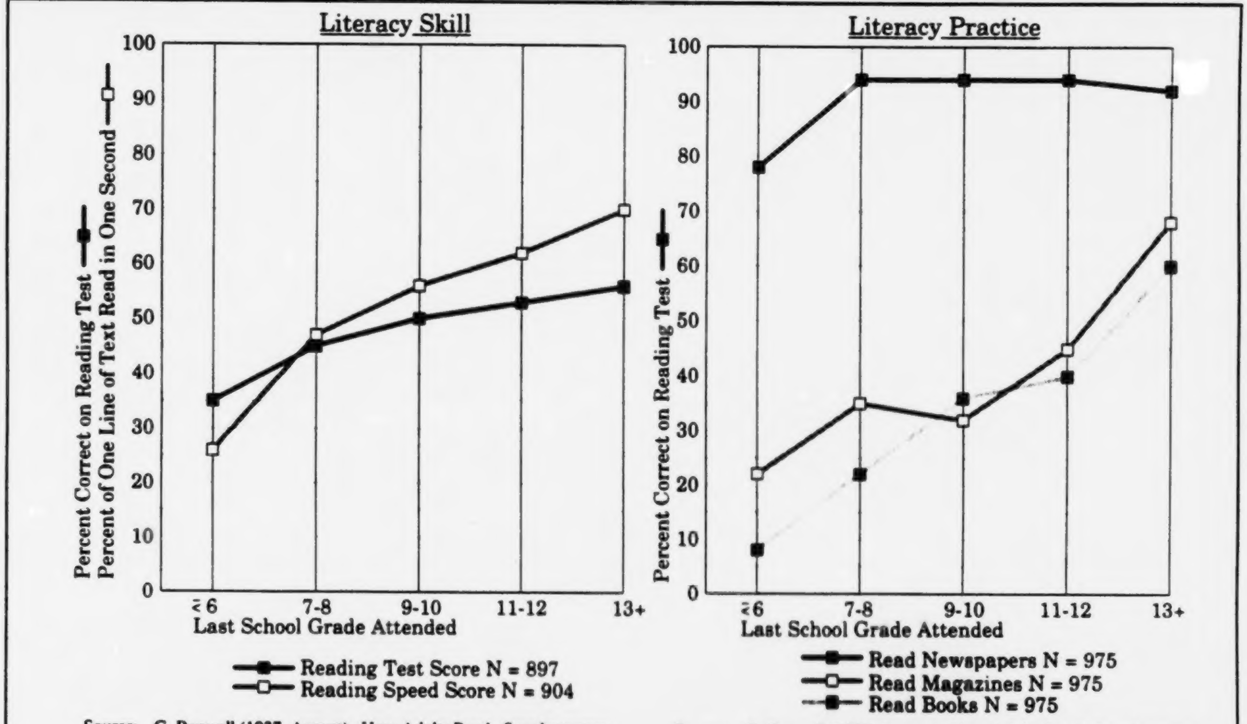
As another indicator of reading skill, Buswell obtained eye movement data for most of the adults. These data made it possible to see how reading skill changed as a function of education when measured in terms of the percent of one line of text that could be read in one second.

In addition to measures of reading skill, Buswell also obtained data on reading practices of the adults. In interviews with the adults, regarding newpaper and magazine reading, the question was asked: "Do you read newspapers and magazines regularly, only occasionally, or not at all?" In regard to books, the question was stated: "Do you read many books, few books, or none?"

Figure 15 summarizes the results obtained by Buswell for both reading skills and practices. As indicated, both skills and practices increase as years of education increase. This suggests that one function of education is to guide readers to read more and that reading more leads to greater skill. In turn, this may lead one to be more successful in school and to pursue further education, thus leading to greater reading practices and greater skill and so forth.

The reading test items that Buswell used are given in Figures 16 - 21.

FIGURE 15 **Literacy: Chicago - 1937**

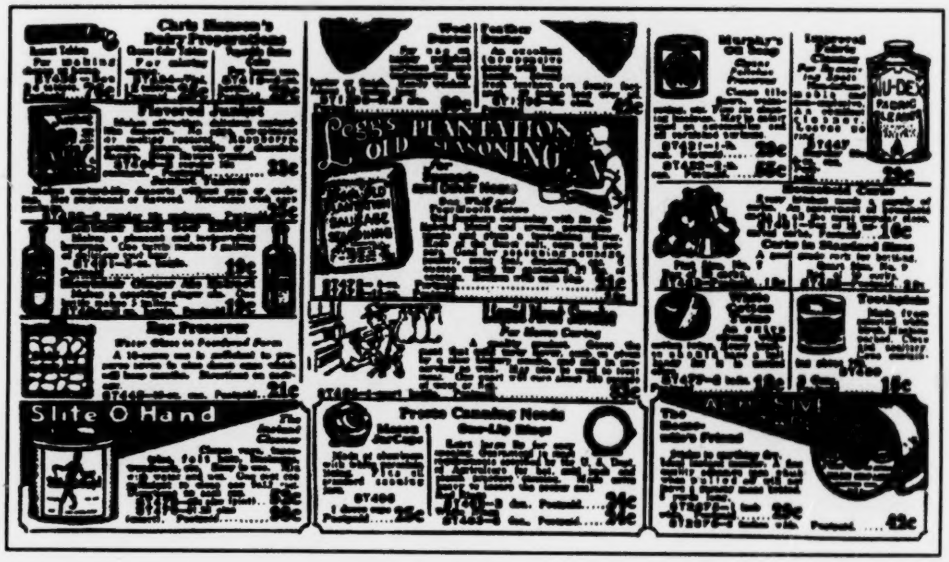


Source: G. Buswell (1937, August). How Adults Read. Supplementary Educational Monographs. Number 45. Chicago: University Of Chicago Press, (pp. 57 & 71, tables 14 & 18 for N = 904).

Source: G. Buswell (1937, August). How Adults Read. Supplementary Educational Monographs. Number 45. Chicago: University Of Chicago Press, (p. 27, table 4).

Figure 16 Buswell Reading Test Item

PRICE LIST


Legg's Plantation Old Seasoning
NU-DEX
Egg Preserver
Slite O Hand
Presto Canning Needs

FIND THE PRICES OF THE FOLLOWING ARTICLES:

3 cans toothpicks ______________________ ________
1 wool duster ______________________ ________
1 3-oz. bottle Montclair Ginger Ale Extract ______________________ ________
1 roll adhesive tape 2 in. wide ______________________ ________
1 1-qt. bottle Liquid Meat Smoke ______________________ ________
1 can Nu-Dex Fabric Cleaner ______________________ ________
2 balls white cotton twine ______________________ ________
1 doz. Mason jar caps ______________________ ________
2 pkgs. Junket tablets ______________________ ________
1 box assorted corks ______________________ ________
1 Slite-O-Hand Cleaner (pint) ______________________ ________
1 bottle of Vegetable Butter Color ______________________ ________
1 can Egg Preserver ______________________ ________
1 roll adhesive tape 1 in. wide ______________________ ________
1 16-oz. pkg. Legg's Old Plantation Seasoning ______________________ ________
1 box Rennet tablets ______________________ ________
3 doz. red one-lip Canning Rings ______________________ ________
1 vial Cheese Color tablets ______________________ ________
1 bag corks - pint size, No. 7 ______________________ ________

Source: G. Buswell (1937, August). How Adults Read. Supplementary Educational Monographs. Number 45. Chicago: University Of Chicago Press, (p.149).

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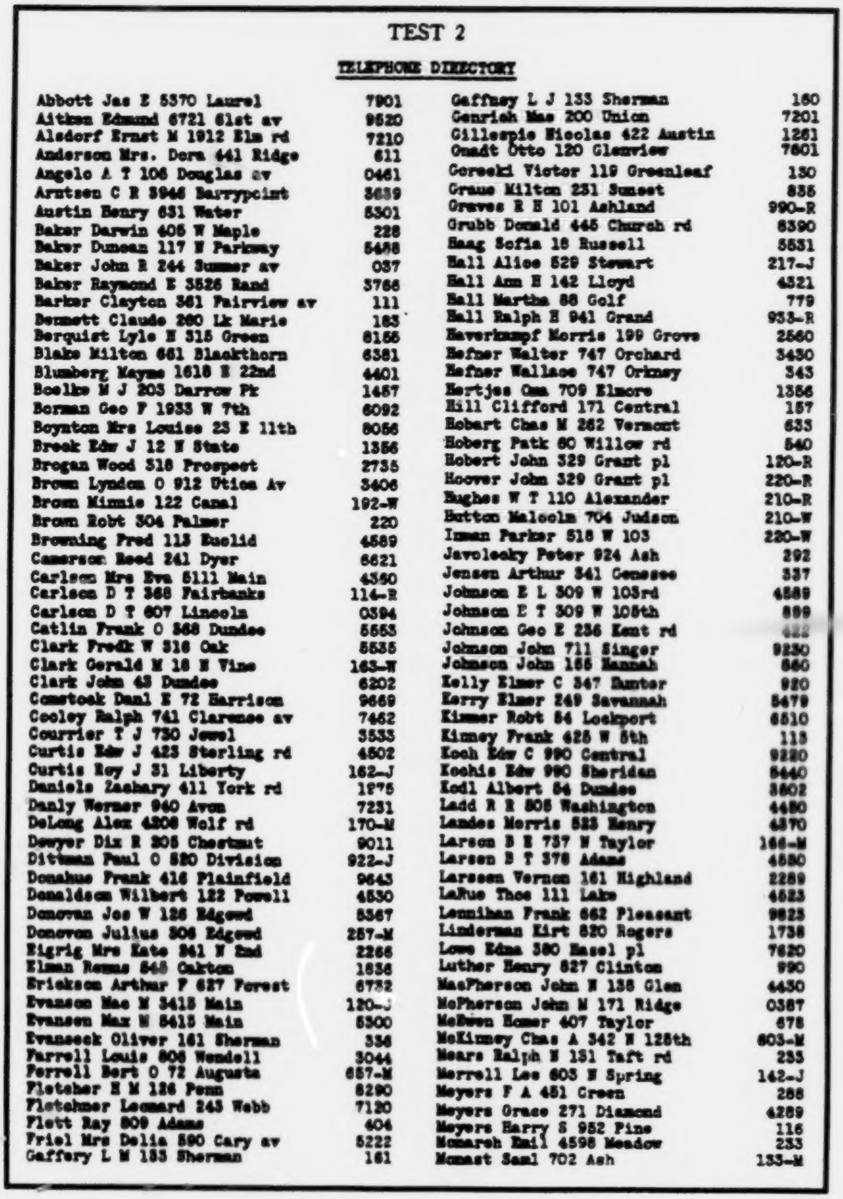
FIGURE 17 Buswell Reading Test Item



TEST 2

TELEPHONE DIRECTORY

Abbott Jas E 5370 Laurel	7901
Aitken Edmund 6721 61st av	9520
Alsdorf Ernst M 1912 Elm rd	7210
Anderson Mrs. Dora 441 Ridge	611
Angelo A T 106 Douglas av	0461
Arntsen C R 3946 Barrypoint	3639
Austin Henry 631 Water	6301
Baker Darwin 406 W Maple	228
Baker Duncan 117 N Parkway	5468
Baker John R 244 Summer av	037
Baker Raymond E 3526 Rand	3766
Barker Clayton 361 Fairview av	111
Bennett Claude 280 Lk Marie	183
Berquist Lyle H 315 Green	8165
Blake Milton 661 Blackthorn	6381
Blumberg Mayme 1618 E 22nd	4401
Boelke M J 203 Darrow Pk	1457
Borman Geo F 1933 W 7th	6092
Boynton Mrs Louise 23 E 11th	8056
Breck Edw J 12 N State	1356
Brogan Wood 318 Prospect	2735
Brown Lyndon O 912 Utica Av	3406
Brown Minnie 122 Canal	192-W
Brown Robt 304 Palmer	220
Browning Fred 113 Euclid	4589
Cameron Reed 241 Dyer	6621
Carlson Mrs Eva 6111 Main	4360
Carlson D T 368 Fairbanks	114-R
Carlson D T 607 Lincoln	0394
Catlin Frank O 368 Dundee	5553
Clark Fredk W 316 Oak	5535
Clark Gerald M 18 E Vine	163-W
Clark John 43 Dundee	6202
Comstock Danl E 72 Harrison	9669
Cooley Ralph 741 Clarence av	7462
Courrier T J 730 Jewel	3533
Curtis Edw J 423 Sterling rd	4502
Curtis Roy J 31 Liberty	162-J
Daniels Zachary 411 York rd	1875
Danly Werner 960 Avon	7231
DeLong Alex 4208 Wolf rd	170-M
Dewyer Dix R 205 Chestnut	9011
Dittman Paul O 520 Division	922-J
Donahue Frank 416 Plainfield	9643
Donaldson Wilbert 122 Powell	4530
Donovan Jos W 126 Edgewd	8367
Donovan Julius 306 Edgewd	257-M
Eigrig Mrs Kate 341 N End	2266
Elman Remus 548 Oakton	1836
Erickson Arthur F 627 Forest	6732
Evanson Mae M 3415 Main	120-J
Evansen Max M 5415 Main	5300
Evanseck Oliver 161 Sherman	336
Farrell Louis 806 Wendell	3044
Ferrell Bert O 72 Augusta	657-M
Fletcher E M 126 Penn	8290
Fletchner Leonard 243 Webb	7120
Flett Ray 809 Adams	404
Friel Mrs Delia 590 Cary av	5222
Gaffery L M 133 Sherman	161
Gaffney L J 133 Sherman	160
Genrich Mae 200 Union	7201
Gillespie Nicolas 422 Austin	1261
Gnadt Otto 120 Glenview	7601
Gorecki Victor 119 Greenleaf	130
Graue Milton 231 Sunset	835
Graves R H 101 Ashland	990-R
Grubb Donald 445 Church rd	8390
Haag Sofia 18 Russell	5531
Hall Alice 529 Stewart	217-J
Hall Ann H 142 Lloyd	4321
Hall Martha 88 Golf	779
Hall Ralph H 941 Grand	933-R
Haverkampf Morris 199 Grove	2560
Hefner Walter 747 Orchard	3430
Hefner Wallace 747 Orkney	343
Hertjes Oma 709 Elmore	1356
Hill Clifford 171 Central	157
Hobart Chas M 262 Vermont	633
Hoberg Patk 60 Willow rd	540
Hobert John 329 Grant pl	120-R
Hoover John 329 Grant pl	220-R
Hughes W T 110 Alexander	210-R
Hutton Malcolm 704 Judson	210-W
Inman Parker 518 W 103	220-W
Javolecky Peter 924 Ash	292
Jensen Arthur 341 Genesee	337
Johnson E L 309 W 103rd	4589
Johnson E T 309 W 105th	899
Johnson Geo E 236 Kent rd	422
Johnson John 711 Singer	9230
Johnson John 155 Hannah	860
Kelly Elmer C 347 Hunter	920
Kerry Elmer 249 Savannah	5479
Kimmer Robt 84 Lockport	6510
Kinney Frank 425 W 8th	113
Koch Edw C 990 Central	9220
Kochis Edw 990 Sheridan	8440
Kodl Albert 84 Dundee	3802
Ladd R R 808 Washington	4480
Landes Morris 823 Henry	4370
Larson B E 737 N Taylor	166-M
Larsen B T 378 Adams	4580
Larssen Vernon 161 Highland	2289
LaRue Thos 111 Lake	4623
Lennihan Frank 662 Pleasant	9823
Linderman Kirt 820 Rogers	1738
Lowe Edna 380 Hazel pl	7620
Luther Henry 827 Clinton	990
MacPherson John N 138 Glen	4430
McPherson John M 171 Ridge	0387
McEwen Homer 407 Taylor	678
McKinney Chas A 342 N 128th	603-M
Meara Ralph E 131 Taft rd	233
Merrell Lee 603 E Spring	142-J
Meyers F A 451 Green	288
Meyers Grace 271 Diamond	4289
Meyers Harry S 952 Pine	116
Monarch Emil 4598 Meadow	233
Monast Saml 702 Ash	133-M

Source: G. Buswell (1937, August). How Adults Read. Supplementary Educational Monographs. Number 45. Chicago: University Of Chicago Press. (p.150).

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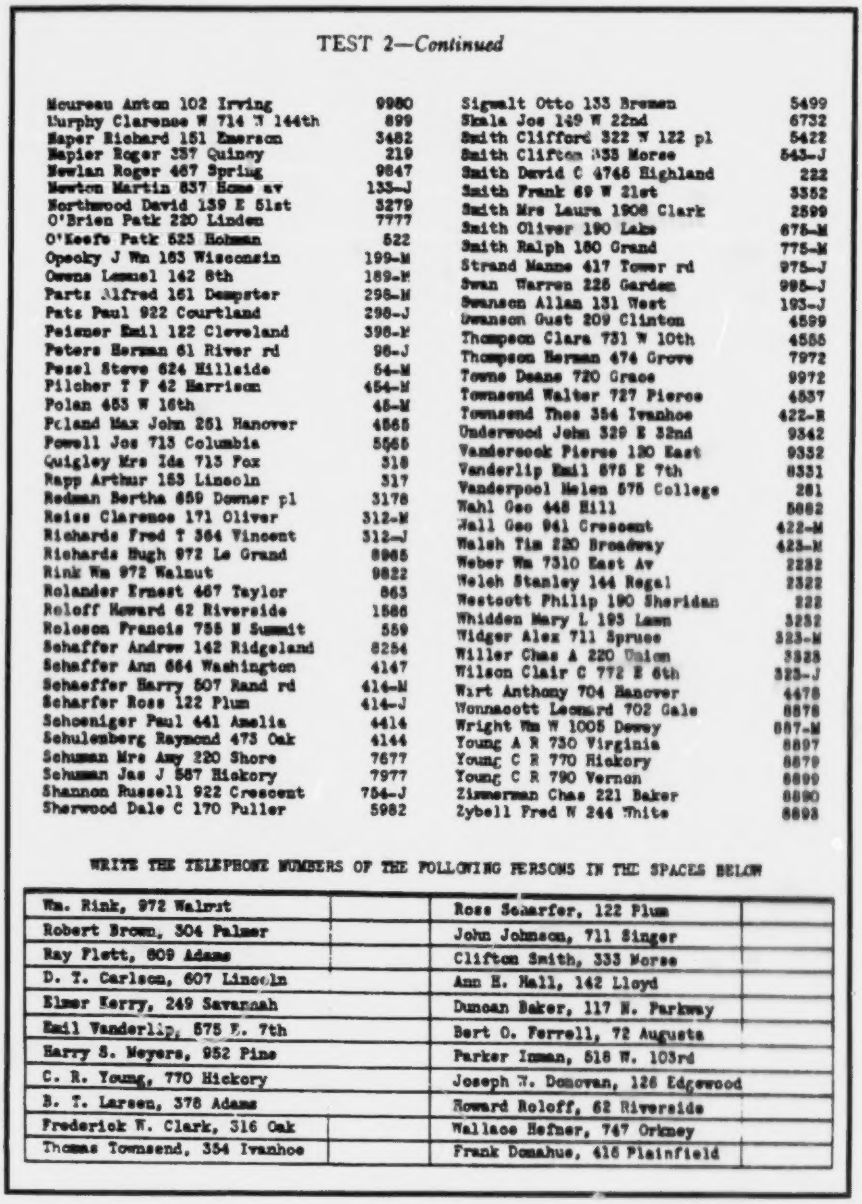
FIGURE 18 Buswell Reading Test Item



TEST 2—*Continued*

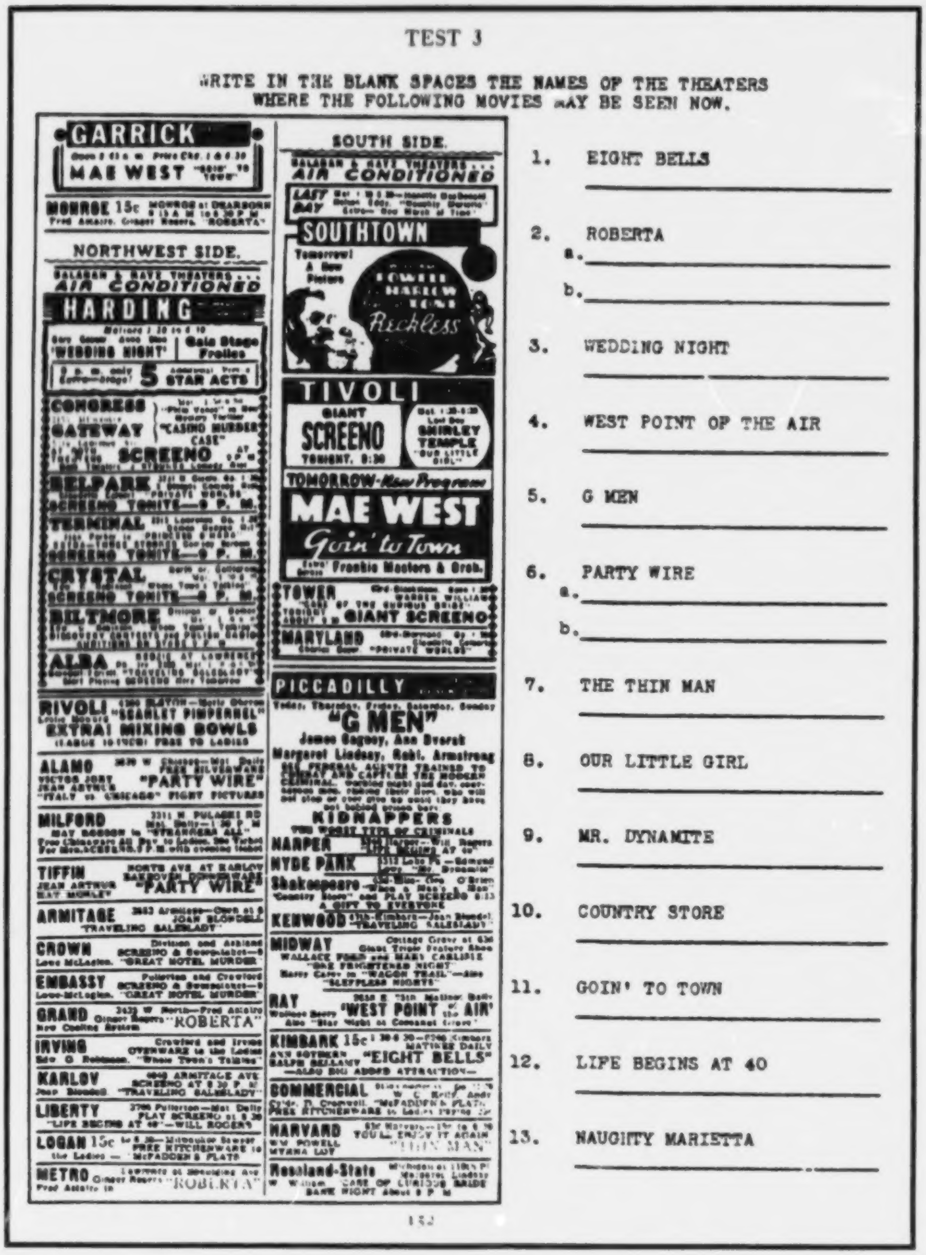
Moureau Anton 102 Irving	9980
Murphy Clarence W 714 W 144th	899
Naper Richard 151 Emerson	3482
Napier Roger 337 Quincy	219
Newlan Roger 467 Spring	9847
Newton Martin 837 Home av	133-J
Northwood David 139 E 51st	3279
O'Brien Patk 220 Linden	7777
O'Keefe Patk 523 Hohman	522
Opecky J Wm 163 Wisconsin	199-M
Owens Lemuel 142 8th	189-M
Partz Alfred 161 Dempster	298-M
Patz Paul 922 Courtland	298-J
Peisner Emil 122 Cleveland	398-M
Peters Herman 61 River rd	98-J
Pesel Steve 624 Hillside	54-M
Pilcher T F 42 Harrison	454-M
Polen 453 W 16th	45-M
Poland Max John 261 Hanover	4565
Powell Joe 713 Columbia	5565
Quigley Mrs Ida 713 Fox	318
Rapp Arthur 153 Lincoln	317
Redman Bertha 659 Downer pl	3178
Reiss Clarence 171 Oliver	312-M
Richards Fred T 364 Vincent	312-J
Richards Hugh 972 Le Grand	8965
Rink Wm 972 Walnut	9822
Rolander Ernest 467 Taylor	863
Roloff Howard 62 Riverside	1586
Roleson Francis 755 N Summit	559
Schaffer Andrew 142 Ridgeland	8254
Schaffer Ann 664 Washington	4147
Schaeffer Harry 507 Rand rd	414-M
Scharfer Ross 122 Plum	414-J
Schoeniger Paul 441 Amelia	4414
Schulenberg Raymond 473 Oak	4144
Schuman Mrs Amy 220 Shore	7677
Schuman Jas J 587 Hickory	7977
Shannon Russell 922 Crescent	754-J
Sherwood Dale C 170 Fuller	5982
Sigwalt Otto 133 Bremen	5499
Skala Joe 149 W 22nd	6732
Smith Clifford 322 W 122 pl	5422
Smith Clifton 333 Morse	543-J
Smith David C 4745 Highland	222
Smith Frank 69 W 21st	3352
Smith Mrs Laura 1908 Clark	2599
Smith Oliver 190 Lake	675-M
Smith Ralph 180 Grand	775-M
Strand Manne 417 Tower rd	975-J
Swan Warren 225 Garden	995-J
Swanson Allan 131 West	193-J
Swanson Gust 209 Clinton	4599
Thompson Clara 731 W 10th	4555
Thompson Herman 474 Grove	7972
Towne Deane 720 Grace	9972
Townsend Walter 727 Pierce	4537
Townsend Thos 354 Ivanhoe	422-R
Underwood John 329 E 32nd	9342
Vandercook Pierce 130 East	9332
Vanderlip Emil 575 E 7th	8331
Vanderpool Helen 575 College	281
Wahl Geo 448 Hill	5882
Wall Geo 941 Crescent	422-M
Walsh Tim 220 Broadway	423-M
Weber Wm 7310 East Av	2232
Welch Stanley 144 Regal	2322
Westcott Philip 190 Sheridan	222
Whidden Mary L 193 Lawn	3232
Widger Alex 711 Spruce	323-M
Willer Chas A 220 Union	3323
Wilson Clair C 772 E 6th	323-J
Wirt Anthony 704 Hanover	4478
Wonnacott Leonard 702 Gale	8876
Wright Wm W 1005 Dewey	887-M
Young A R 730 Virginia	8897
Young C R 770 Hickory	8879
Young C R 790 Vernon	8899
Zimmerman Chas 221 Baker	8890
Zybell Fred W 244 White	8898

WRITE THE TELEPHONE NUMBERS OF THE FOLLOWING PERSONS IN THE SPACES BELOW

Wm. Rink, 972 Walnut		Ross Scharfer, 122 Plum	
Robert Brown, 304 Palmer		John Johnson, 711 Singer	
Ray Plett, 609 Adams		Clifton Smith, 333 Morse	
D. T. Carlson, 607 Lincoln		Ann H. Hall, 142 Lloyd	
Elmer Kerry, 249 Savannah		Duncan Baker, 117 N. Parkway	
Emil Vanderlip, 575 E. 7th		Bert O. Ferrell, 72 Augusta	
Harry S. Meyers, 952 Pine		Parker Inman, 518 W. 103rd	
C. R. Young, 770 Hickory		Joseph W. Donovan, 126 Edgewood	
B. T. Larsen, 378 Adams		Howard Roloff, 62 Riverside	
Frederick W. Clark, 316 Oak		Wallace Hefner, 747 Orkney	
Thomas Townsend, 354 Ivanhoe		Frank Donahue, 416 Plainfield	

Source: G. Buswell (1937, August). How Adults Read. Supplementary Educational Monographs. Number 45. Chicago: University Of Chicago Press. (p.151).

FIGURE 19 **Buswell Reading Test Item**



TEST 3

WRITE IN THE BLANK SPACES THE NAMES OF THE THEATERS WHERE THE FOLLOWING MOVIES MAY BE SEEN NOW.

1. EIGHT BELLS ____
2. ROBERTA
   a. ____
   b. ____
3. WEDDING NIGHT ____
4. WEST POINT OF THE AIR ____
5. G MEN ____
6. PARTY WIRE
   a. ____
   b. ____
7. THE THIN MAN ____
8. OUR LITTLE GIRL ____
9. MR. DYNAMITE ____
10. COUNTRY STORE ____
11. GOIN' TO TOWN ____
12. LIFE BEGINS AT 40 ____
13. NAUGHTY MARIETTA ____

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Source: G. Buswell (1937, August). How Adults Read. Supplementary Educational Monographs. Number 45. Chicago: University Of Chicago Press, (p.152).

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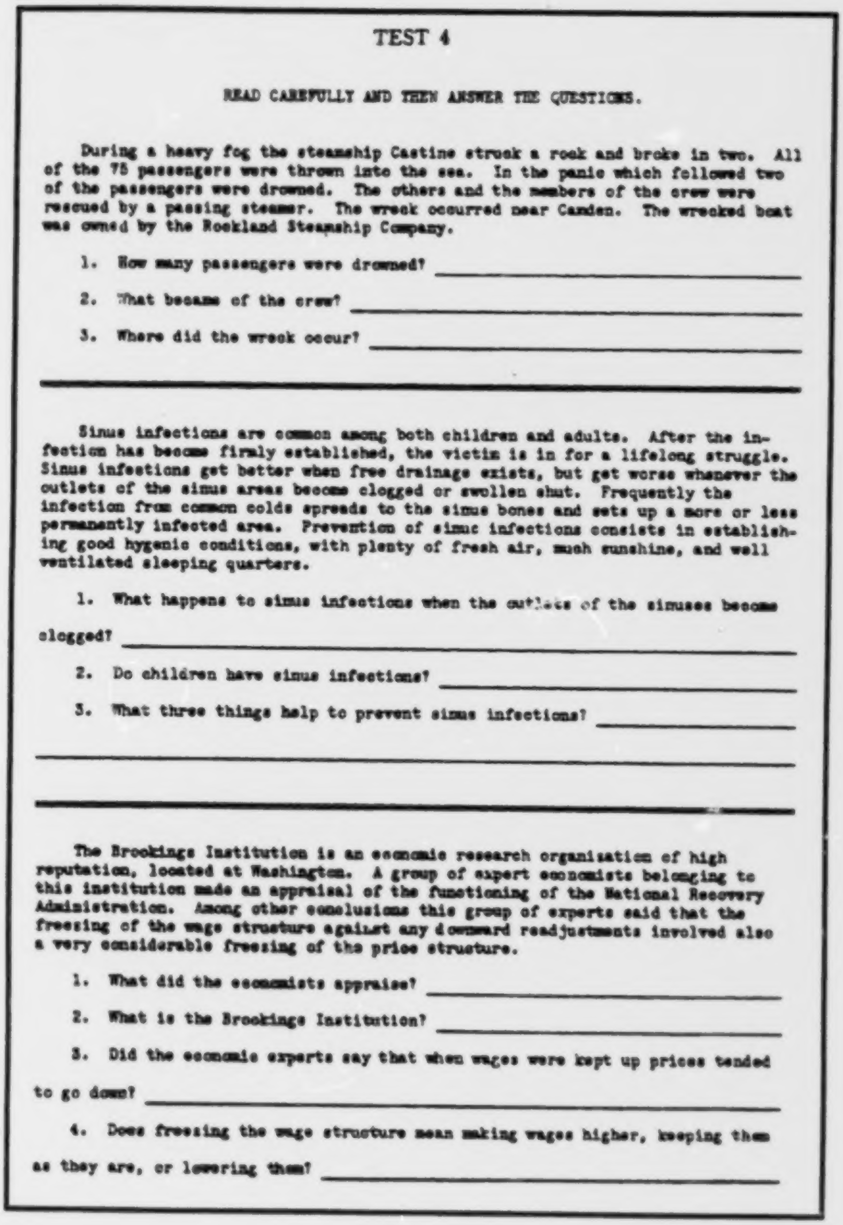
FIGURE 20 Buswell Reading Test Item



TEST 4

READ CAREFULLY AND THEN ANSWER THE QUESTIONS.

During a heavy fog the steamship Castine struck a rock and broke in two. All of the 75 passengers were thrown into the sea. In the panic which followed two of the passengers were drowned. The others and the members of the crew were rescued by a passing steamer. The wreck occurred near Camden. The wrecked boat was owned by the Rockland Steamship Company.

1. How many passengers were drowned? ____________________
2. What became of the crew? ____________________
3. Where did the wreck occur? ____________________

Sinus infections are common among both children and adults. After the infection has become firmly established, the victim is in for a lifelong struggle. Sinus infections get better when free drainage exists, but get worse whenever the outlets of the sinus areas become clogged or swollen shut. Frequently the infection from common colds spreads to the sinus bones and sets up a more or less permanently infected area. Prevention of sinuc infections consists in establishing good hygenic conditions, with plenty of fresh air, much sunshine, and well ventilated sleeping quarters.

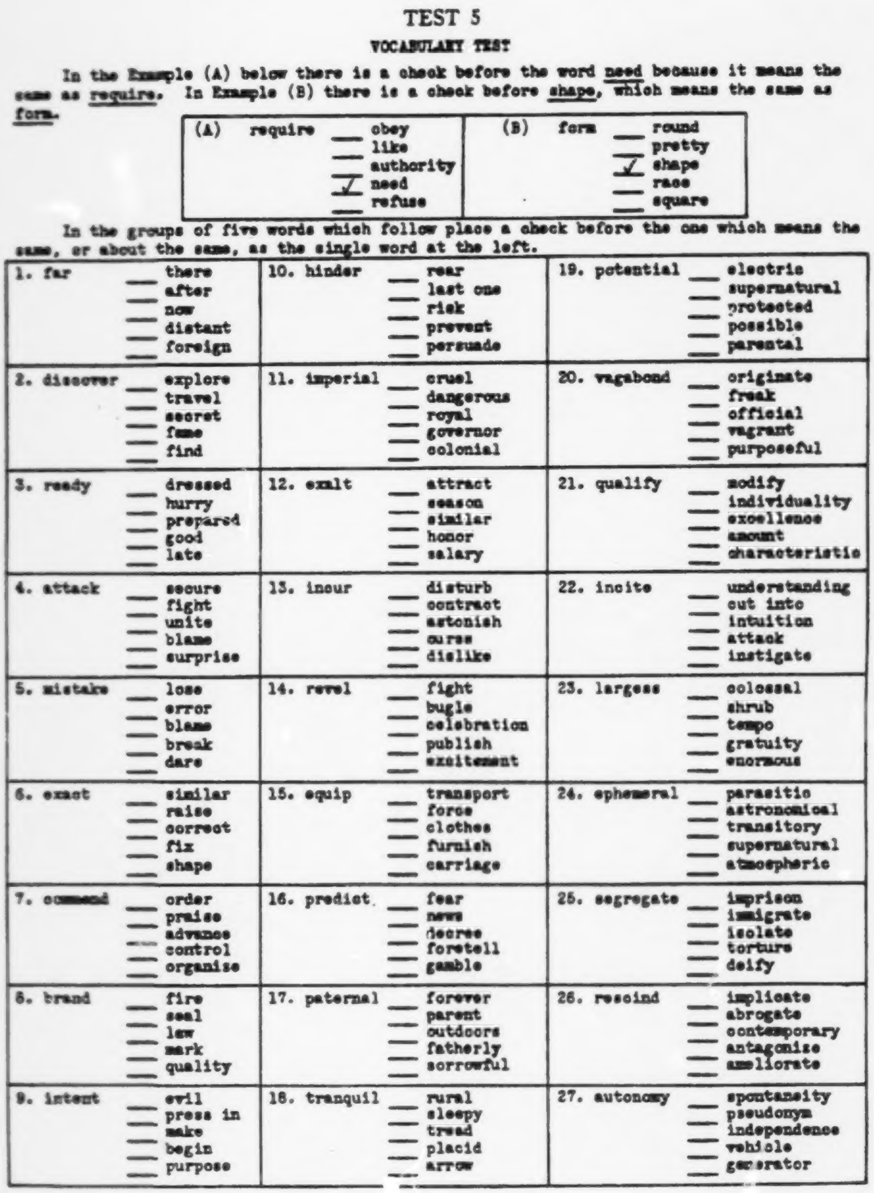
1. What happens to sinus infections when the outlets of the sinuses become clogged? ____________________
2. Do children have sinus infections? ____________________
3. What three things help to prevent sinus infections? ____________________

The Brookings Institution is an economic research organisation of high reputation, located at Washington. A group of expert economists belonging to this institution made an appraisal of the functioning of the National Recovery Administration. Among other conclusions this group of experts said that the freezing of the wage structure against any downward readjustments involved also a very considerable freezing of the price structure.

1. What did the economists appraise? ____________________
2. What is the Brookings Institution? ____________________
3. Did the economic experts say that when wages were kept up prices tended to go down? ____________________
4. Does freezing the wage structure mean making wages higher, keeping them as they are, or lowering them? ____________________

Source: G. Buswell (1937, August). How Adults Read. Supplementary Educational Monographs. Number 45. Chicago: University Of Chicago Press. (p.153).

FIGURE 21 **Buswell Reading Test Item**



TEST 5

VOCABULARY TEST

In the Example (A) below there is a check before the word need because it means the same as require. In Example (B) there is a check before shape, which means the same as form.

(A) require ___ obey ___ like ___ authority ✓ need ___ refuse	(B) form ___ round ___ pretty ✓ shape ___ race ___ square

In the groups of five words which follow place a check before the one which means the same, or about the same, as the single word at the left.

1. far ___ there ___ after ___ now ___ distant ___ foreign	10. hinder ___ rear ___ last one ___ risk ___ prevent ___ persuade	19. potential ___ electric ___ supernatural ___ protected ___ possible ___ parental
2. discover ___ explore ___ travel ___ secret ___ fame ___ find	11. imperial ___ cruel ___ dangerous ___ royal ___ governor ___ colonial	20. vagabond ___ originate ___ freak ___ official ___ vagrant ___ purposeful
3. ready ___ dressed ___ hurry ___ prepared ___ good ___ late	12. exalt ___ attract ___ season ___ similar ___ honor ___ salary	21. qualify ___ modify ___ individuality ___ excellence ___ amount ___ characteristic
4. attack ___ secure ___ fight ___ unite ___ blame ___ surprise	13. incur ___ disturb ___ contract ___ astonish ___ curse ___ dislike	22. incite ___ understanding ___ cut into ___ intuition ___ attack ___ instigate
5. mistake ___ lose ___ error ___ blame ___ break ___ dare	14. revel ___ fight ___ bugle ___ celebration ___ publish ___ excitement	23. largess ___ colossal ___ shrub ___ tempo ___ gratuity ___ enormous
6. exact ___ similar ___ raise ___ correct ___ fix ___ shape	15. equip ___ transport ___ force ___ clothes ___ furnish ___ carriage	24. ephemeral ___ parasitic ___ astronomical ___ transitory ___ supernatural ___ atmospheric
7. command ___ order ___ praise ___ advance ___ control ___ organize	16. predict ___ fear ___ news ___ decree ___ foretell ___ gamble	25. segregate ___ imprison ___ immigrate ___ isolate ___ torture ___ deify
8. brand ___ fire ___ seal ___ law ___ mark ___ quality	17. paternal ___ forever ___ parent ___ outdoors ___ fatherly ___ sorrowful	26. rescind ___ implicate ___ abrogate ___ contemporary ___ antagonize ___ ameliorate
9. intent ___ evil ___ press in ___ make ___ begin ___ purpose	18. tranquil ___ rural ___ sleepy ___ tread ___ placid ___ arrow	27. autonomy ___ spontaneity ___ pseudonym ___ independence ___ vehicle ___ generator

Source: G. Buswell (1937, August). How Adults Read. Supplementary Educational Monographs. Number 45. Chicago: University Of Chicago Press, (p.154).

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National Assessment of Educational Progress - 1970-71

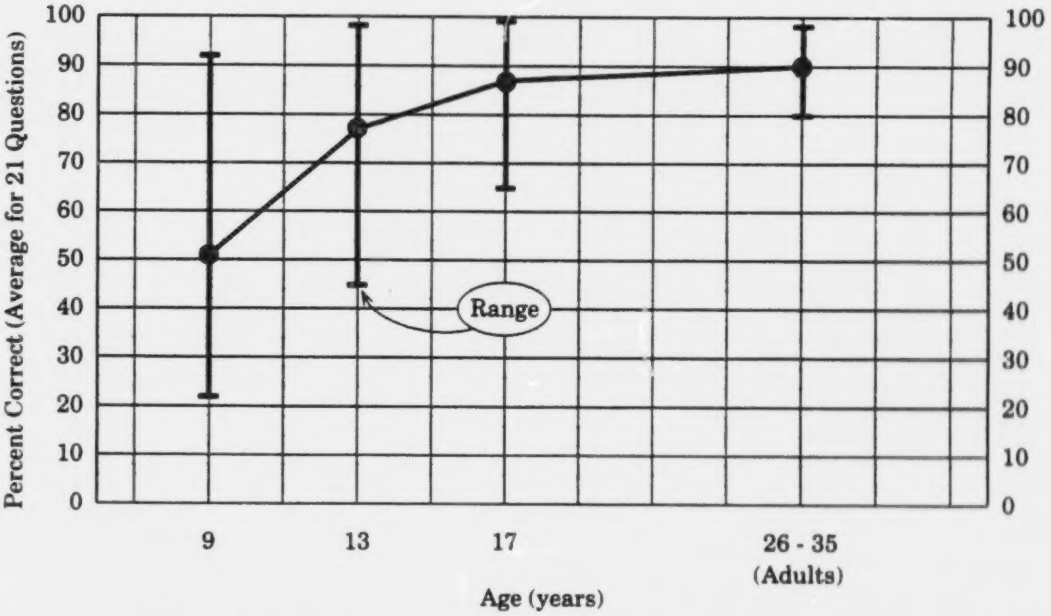
The National Assessment of Educational Progress (NAEP) for years 1970-71 was unique in obtaining data on 21 items for 9, 13, and 17 year olds as well as for adults 26 to 35 years old. This makes it possible to see how performance on the same items improved at different age levels.

Figure 22 summarizes the improvement in performance of the 21 items at different age levels. The figure shows a considerable range of performance at age nine, with scores ranging from just over 20 percent correct to over 90 percent correct averaged over the 21 items. At the adult level, however, scores range from 80 to over 95 percent correct. This indicates that developmentally, as children grow up, attend school and become adults, they grow progressively more literate.

Figures 23 -28 show the 21 items used in the assessment. Each item shows the information Display that was presented to the examinee, the Questions asked and the Outcomes for each age level.

Figure 29 shows average performance for each of the 21 items for adult Whites and African-Americans.

FIGURE 22 National Assessment of Educational Progress - 1971



Performance on the National Assessment of Educational Progress for 1971. Responses by all age groups to the same 21 questions about 8 different information sources.

Source: National Assessment of Educational Progress. (1973, July). Reading: Reading Excerises. Report 02-R-20. Washingtor, DC: U.S. Government Printing Office.

FIGURE 23 NAEP 1973 Assessment Items

ITEMS 1 - 7: NAEP Theme: Reading Reference Materials
B. Use of Listening and Speaking Skills

DISPLAY

(Give dictionary to student.
Ask the first two questions and record the main points of his responses.)

(If the student defines both words correctly, read 3 - 7 to him and record his answers, even if he cannot do some or all of the tasks. If he cannot define one or both of the words, give him the definition(s), using the dictionary and showing him a word and its definition if necessary, then continue with 3.

If he answers 3, either correctly or incorrectly, continue with 4 - 7. If he cannot answer 3, give him the definition(s) once more and repeat 3. If he then answers 3, either correctly or incorrectly, continue with 3 - 7. If he stops working, encourage him to continue. If he still cannot answer 3, discontinue, explain the situation in 3, and go to the next exercise.

Note:
(For more of the answers to the questions, several alternative but acceptable responses are given in the NAEP Report.)

Outcomes by
Age & Approximate School Grades

Age:	9	13	17	adult
Grade:	3	7	12	----
Percent Correct:				
1.	77	93	95	94
2.	17	78	90	83
3.	91	97	98	97
4.	53	91	96	93
5.	93	98	99	98
6.	71	93	97	97
7.	65	95	98	95

QUESTION & RESPONSE MODE

1. First ask: "What is a dictionary?"

* (Dictionary: "A book that tells you what words mean."
"A book that tells you how to use words.")

2. Then ask: "What does the word 'define' mean?"

** (Define: "To give the meaning of words," or
"A book that tells you how to use words.")

3. Open the book to page 15 and tell me any three words defined on that page.
   1. *Allied*
   2. *Almanac*
   3. *Aloe*

4. Tell me the last word defined in the "P" section.
Python

5. Tell me the number of the last page in the dictionary.
632

6. Tell me the number of the page on which you can find out what the word "bake" means.
41

7. Tell me the word which is defined just before the word "house" and the word which is defined just after the word "house."

Just before	*Hourly*
Just after	*Houseboat*

Source: National Assessment of Educational Progress. (1973, July). Reading: Reading Exercises, Report 02-R-20. Washington, DC: U.S. Government Printing Office. (p.37)

FIGURE 24 NAEP 1973 Assessment Items

ITEMS 8 - 12: NAEP Theme: Reading Reference Materials
B. Use of Listening and Reading Skills

DISPLAY

(Give the student a copy of the TV schedule and say to him, "Here is part of a TV guide you might find in a newspaper. After you have read it, I will ask you some questions about it. You may look at the schedule as many times as is necessary to answer the questions.")

2:00 p.m.	2	Super Mutt - Cartoon
	4	Baseball Color Teams to be announced. (Runs to 4:00: followed by Baseball Scoreboard.)
	6	Top Cat - Cartoons
	7	Movie - Mystery "Master Sleuth" (1945) Master detective (Bob Johnston) and sidekick (Pat Morgan) are on the trail of a deadly escaped convict. Sue Jones, Mort Roberts (90min.)
2:30 p.m.	2	Children's Variety Repeat Today the show goes to Detroit to watch cars being assembled (60 min.)
	6	Visit the Zoo Special Famous San Diego Zoo is toured.
3:00 p.m.	6	Music Beat Jay Nickels hosts an hour of popular music of local groups

QUESTION & RESPONSE MODE

(Read the questions to the student and record his answers.)

8. Which program is being run for at least a second time?
Children's Variety

9. If you watched the entire movie, could you also see the entire program about the San Diego Zoo?

○ Yes
● No
○ I don't know.

10. Why is there no new program listed on Channel 4 beginning at 3:00 p.m.?
Baseball game runs until 4:00 p.m.

11. At what time are the cartoons shown?
2:00 p.m.

12. How long is the program on Channel 6 at 3:00 p.m.?

○ 30 minutes
● 60 minutes
○ 90 minutes
○ 120 minutes
○ I don't know.

Outcomes by
Age & Approximate School Grades

Age:	9	13	17	adult
Grade:	3	7	12	----
Percent Correct:				
8.	37	68	84	84
9.	48	72	85	88
10.	44	69	84	89
11.	73	84	92	94
12.	59	61	69	80

Source: National Assessment of Educational Progress. (1973, July). Reading: Reading Exercises, Report 02-R-20. Washington, DC: U.S. Government Printing Office. (p.37)

FIGURE 25 NAEP 1973 Assessment Items

ITEM 13: NAEP Theme: Reading Reference Materials
B. Reading for Facts

DISPLAY

Read the passage and answer the question which follows it.

A sports car differs from an ordinary passenger car in that its size and number of accessories are limited. The sports car also differs from the ordinary passenger car in performance. It can attain higher speeds because it is built smaller and lower. For these reasons it can also turn corners faster and more smoothly than a passenger car. A sports car also generally gets better gas mileage than an ordinary passenger car.

Source: National Assessment of Educational Progress. (1973, July). Reading: Reading Exercises, Report 02-R-20. Washington, DC: U.S. Government Printing Office. (p.37)

QUESTION & RESPONSE MODE

13. Which of these is the reason that a sports car can turn a corner more easily than passenger cars?

○ Compact size and disk brakes
○ Coil suspension and power steering
● Small size and low center of gravity
○ Great length and minimum of accessories
○ Road-gripping lines and heavy shock absorbers
○ I don't know.

Outcomes by
Age & Approximate School Grades

Age:	9	13	17	adult
Grade:	3	7	12	----
Percent Correct:				
13.	42	69	89	92

ITEM 14 - 16: NAEP Theme: Reading Reference Materials
B. Reading for Facts

DISPLAY

Read the passage and answer the questions on the next two pages. You may look back to this page if you wish.

POISON IVY

The interval for burning. itching and finally water-filled blisters to appear varies a great deal. This, again, may depend on some differences in human skin; and the symptoms of dermatitis can develop within a few hours or even days later. The most important factor in using any remedy or treatment is TIME. Unless you can wash the poisonous sap away within 5 to 10 minutes after exposure, you are likely to be in trouble. Wash the entire body at once with any bland soap and then change clothing which must be laundered before being worn again. It is, of course, very obvious that washing is not always possible immediately after known contact with such irritating plants, and a tub or shower after outdoor activity is generally too late to avoid dermatitis if you have been exposed to or in contact with poison ivy. The blister fluid associated with ivy poisoning does not spread the iritation; but it is the oily, poisonous resin which is transferred to other skin areas by rubbing or scratching.

There are some simple preparations for treatment of ivy poisoning. An easily prepared "remedy" can be made by using equal parts of baking soda and cornstarch with enough water to form a paste or a lotion. Wet packs of boric acid are helpful in case of severely poisoned eyelids and swollen eyes. Calamine lotion can be used to soothe the discomfort of itching, burning skin. Preparations containing iron salts are likely to cause permanent tattoo effects, especially if skin in the area of application is broken.

Source: National Assessment of Educational Progress. (1973, July). Reading: Reading Exercises, Report 02-R-20. Washington, DC: U.S. Government Printing Office. (p.38)

QUESTION & RESPONSE MODE

14. Which of the following is essential to avoid ivy dermatitis once a person is exposed to poison ivy?

○ Cut down the ivy plant.
○ Do not scratch the affected areas.
○ Put calamine lotion on the affected areas.
○ Put iron salt solution on the exposed areas.
● Wash all exposed areas withing about five minutes of exposure.
○ I don't know.

15. Which of the following will soothe the itching from ivy poisoning?

○ Cut down the ivy plant.
○ Do not scratch the affected areas.
● Put calamine lotion on the affected areas.
○ Put iron salt solution on the exposed areas.
○ Wash all exposed areas withing about five minutes of exposure.
○ I don't know.

16. What should you do if the ivy poisoning affects your eyelids?

○ Apply calamine lotion.
○ Apply iron salt solution.
○ Apply mild soap solution.
● Apply wet packs of boric acid solution.
○ Apply a paste of baking soda and cornstarch.
○ I don't know.

Outcomes by Age & Approximate School Grades

Age:	9	13	17	adult
Grade:	3	7	12	----
Percent Correct:				
14.	41	77	85	88
15.	33	79	85	92
16.	21	65	76	86

FIGURE 26 — NAEP 1973 Assessment Items

ITEM 17: NAEP Theme: Reading for Significant Facts
C. Understanding Relationships, Knowing Facts.

DISPLAY

Read the passage and answer the question which follows it.

One spring Farmer Brown had an unusually good field of wheat. Whenever he saw any birds in the field, he got his gun and shot as many of them as he could. In the middle of the summer he found that his wheat was being ruined by insects. With no birds to feed on them, the insects had multiplied very fast. What Farmer Brown did not understand was this: A bird is not simply an animal that eats food the farmer may want for himself. Instead, it is one of many links in the complex surroundings, or environment, in which we live.

How much grain a farmer can raise on an acre of ground depends on many factors. All of these factors can be divided into two big groups. Such things as the richness of the soil, the amount of rainfall, the amount of sunlight, and the temperature belong together in one of these groups. This group may be called non-living factors. The second group may be called living factors. The living factors in any plant's environment are animals and other plants. Wheat, for example, may be damaged by wheat rust, a tiny plant that feeds on wheat; or it may be eaten by plant-eating animals such as birds or grasshoppers.

It is easy to see that the relations of plants and animals to their environment are very complex, and that any change in the environment is likely to bring about a whole series of changes.

QUESTION & RESPONSE MODE

17. The passage also points out the importance of which fact?

- ○ A bird is simply an animal that eats up grain.
- ○ Wheat rust is similar to the rust on your own bicycle.
- ○ Only living factors determine how much corn can be raised.
- ○ How much wheat is grown depends only on how much is planted.
- ● Any change in the environment is likely to cause other changes.
- ○ I don't know.

Outcomes by
Age & Approximate School Grades

Age:	9	13	17	adult
Grade:	3	7	12	----
Percent Correct:				
17.	25	69	82	89

Source: National Assessment of Educational Progress. (1973, July). Reading: Reading Exercises, Report 02-R-20. Washington, DC: U.S. Government Printing Office. (p.54)

ITEM 18: NAEP Theme: Following Written Directions
B. Understanding Written Directions.

DISPLAY

Here is a recipe for making muffins. Read the recipe and answer the question which follows it.

ENGLISH MUFFINS

1	package active dry yeast
1/2	cup warm water
1 1/2	cups milk, scalded
2	tablespoons sugar
2	teaspoons salt
1/4	cup shortening
5 3/4	to 6 cups sifted all-purpose flour

Soften yeast in water. Combine next 4 ingredients; cool to lukewarm. Stir in 2 cups flour; beat well. Add yeast; mix. Add enough of remaining flour to make a moderately stiff dough. Turn out on a lightly floured surface; knead till smooth (8 to 10 minutes). Place in lightly greased bowl, turning dough once. Cover; let rise till double (1 1/4 hours).

Punch down; cover and let rest 10 minutes. Roll to slightly less than 1/2 in thick on lightly floured surface. Cut with a 3-inch round cutter. (Reroll edges.) Cover and let rise till very light (1 1/4 hours). Bake on top of range on medium hot greased griddle, turn frequently till done, about 30 minutes. Cool thoroughly. Split with a fork, toast on both sides. Serve at once. Makes 2 dozen.

QUESTION & RESPONSE MODE

18. How long does it take to bake English muffins on top of range?

- ○ 8 - 10 minutes
- ○ Exactly 10 minutes
- ● About 30 minutes
- ○ 1 1/4 hours
- ○ More than 3 hours
- ○ I don't know.

Outcomes by
Age & Approximate School Grades

Age:	9	13	17	adult
Grade:	3	7	12	----
Percent Correct:				
18.	36	66	65	86

Source: National Assessment of Educational Progress. (1973, July). Reading: Reading Exercises, Report 02-R-20. Washington, DC: U.S. Government Printing Office. (p.21)

FIGURE 27 NAEP 1973 Assessment Items

ITEM 19: NAEP Theme: Following Written Directions
A. Understanding Written Directions.

DISPLAY

Read the passage and answer the question which follows it.

One spring Farmer Brown had an unusally good field of wheat. Whenever he saw any birds in the field, he got his gun and shot as many of them as he could. In the middle of the summer he found that his wheat was being ruined by insects. With no birds to feed on them, the insects had multiplied very fast. What Farmer Brown did not understand was this: A bird is not simply an animal that eats food the farmer may want for himself. Instead, it is one of many links in the complex surroundings, or environment, in which we live.

How much grain a farmer can raise on an acre of ground depends on many factors. All of these factors can be divided into two big groups. Such things as the richness of the soil, the amount of rainfall, the amount of sunlight, and the temperature belong together in one of these groups. This group may be called non-living factors. The second group may be called living factors. The living factors in any plant's environment are animals and other plants. Wheat, for example, may be damaged by wheat rust, a tiny plant that feeds on wheat; or it may be eaten by plant-eating animals such as birds or grasshoppers . . .

It is easy to see that the realtions of plants and animals to their environment are very complex, and that any change in the environment is likely to bring about a whole series of changes.

QUESTION & RESPONSE MODE

19. What is the MAIN idea of this passage?

○ Farmers should not shoot any birds.
○ Insects eat up all the farmer's crops.
○ Birds eat up most of the farmer's grain.
○ No crops can be grown without sunlight.
● All living things are affected by living things.
○ I don't know.

Outcomes by Age & Approximate School Grades				
Age:	9	13	17	adult
Grade:	3	7	12	----
Percent Correct:				
19.	25	69	82	89

Source: National Assessment of Educational Progress. (1973, July). Reading: Reading Exercises, Report 02-R-20. Washington, DC: U.S. Government Printing Office. (p.54)

ITEM 20: NAEP Theme: Following Written Directions
B. Understanding Written Directions.

DISPLAY

Read the passage and complete the sentence which follows.

Skiing has recently become one of the more popular sports in the United States. Because of its popularity, thousands of winter vacationers are flying north rather than south. In many areas, reservations are required months ahead of time.

I discovered the accommodation shortage through an unfortunate experience. On a sunny Saturday morning I set out from Denver for the beckoning slopes of Aspen, Colorado. After passing signs for other ski areas, I finally reached my destination. Naturally I lost no time in heading for the tow. After a stimulating afternoon of miscalculated stem turns I was famished. Well, one thing led to another and it must have been eight o'clock before I concerned myself with a bed for my bruised and aching bones.

It took precisely one phone call to ascertain the lack of lodgings in the Aspen area. I had but one recourse. My auto and I started the treacherous jaunt over the pass and back towards Denver. Along the way, I went begging for a bed. Finally a jolly tavernkeeper took pity and for only thirty dollars a night allowed me the privilege of staying in a musty, dirty, bathless room above his tavern.

QUESTION & RESPONSE MODE

20. The author's problem would have been avoided if he had

○ not tired himself out skiing.
○ taken a bus instead of driving.
○ looked for food as soon as he arrived.
● arranged for accommodations well ahead of his trip.
○ I don't know.

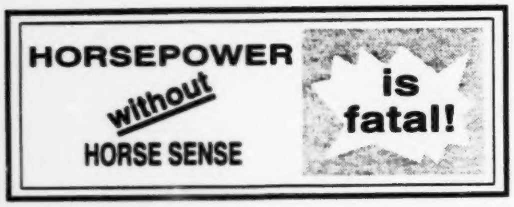
Outcomes by Age & Approximate School Grades				
Age:	9	13	17	adult
Grade:	3	7	12	----
Percent Correct:				
20.	32	77	91	93

Source: National Assessment of Educational Progress. (1973, July). Reading: Reading Exercises, Report 02-R-20. Washington, DC: U.S. Government Printing Office. (p.63)

FIGURE 28 NAEP 1973 Assessment Items

ITEM 21: NAEP Theme: Following Written Directions
A. Understanding Written Directions.

DISPLAY



Source: National Assessment of Educational Progress. (1973, July). Reading: Reading Exercises, Report 02-R-20. Washington, DC: U.S. Government Printing Office. (p.85)

QUESTION & RESPONSE MODE

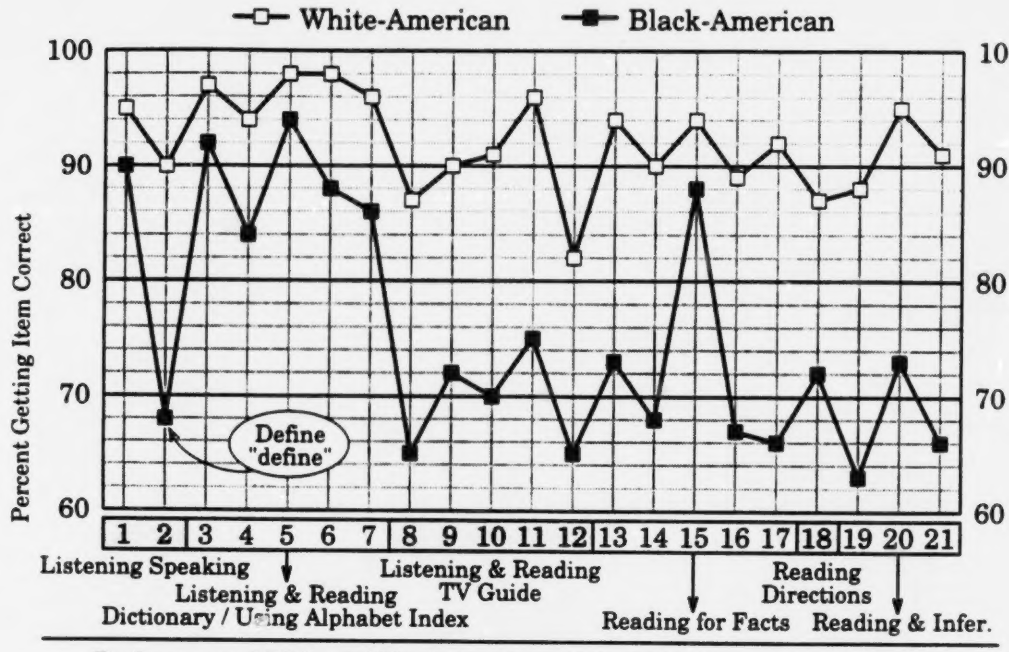
21. Where would you probably see this sign?

● On the highway
○ On a gymnasium floor
○ At a racetrack for horses
○ In a grocery store
○ I don't know.

Outcomes by
Age & Approximate School Grades

Age:	9	13	17	adult
Grade:	3	7	12	----
Percent Correct:				
21.	23	45	76	88

FIGURE 29 | **NAEP 1973 Assessment Survey**



Performance of White and Black American adults (26 - 35 years old) on 21 items from the 1971 National Assessment of Educational Progress.

Source: National Assessment of Educational Progress. (1973, July). Reading: Reading Exercises, Report 02-R-20. Washington, DC: U.S. Government Printing Office.

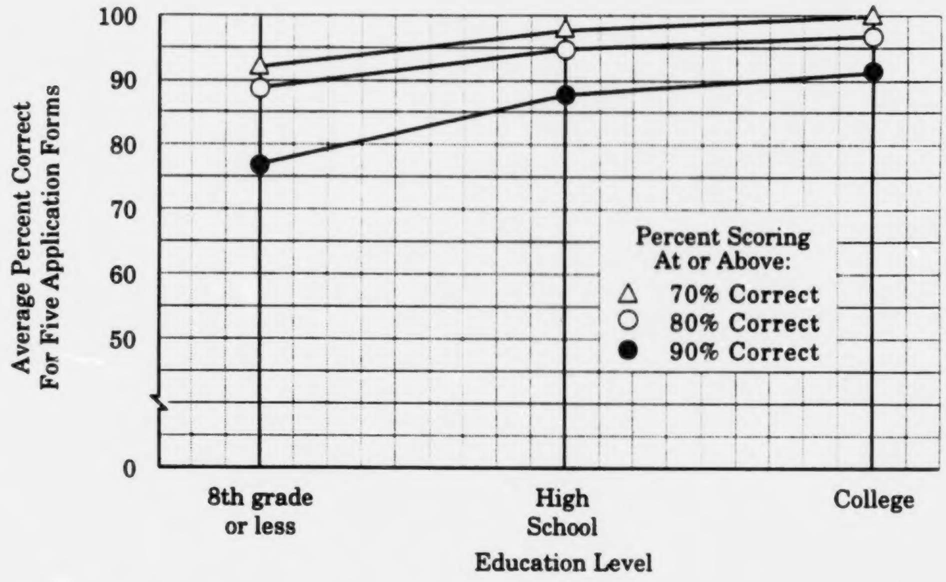
Louis Harris and Associates "Survival Literacy" Study - 1970

In 1970 the Louis Harris polling organization surveyed adults chosen to represent a cross section of the overall population. Those interviewed were asked to fill out five common application forms.

Figure 30 summarizes data averaged over all five forms. The data show the percentage who scored 70 percent correct or better, 80 percent correct or better, and 90 percent correct or better. Because 70 percent correct is a lower criterion, more people score at that level and above than at the more demanding criterion of 90 percent and above. Thus, whereas 92 percent of adults with 8th grade education or less scored 70 percent or better, only 76 percent scored 90 percent or better correct.

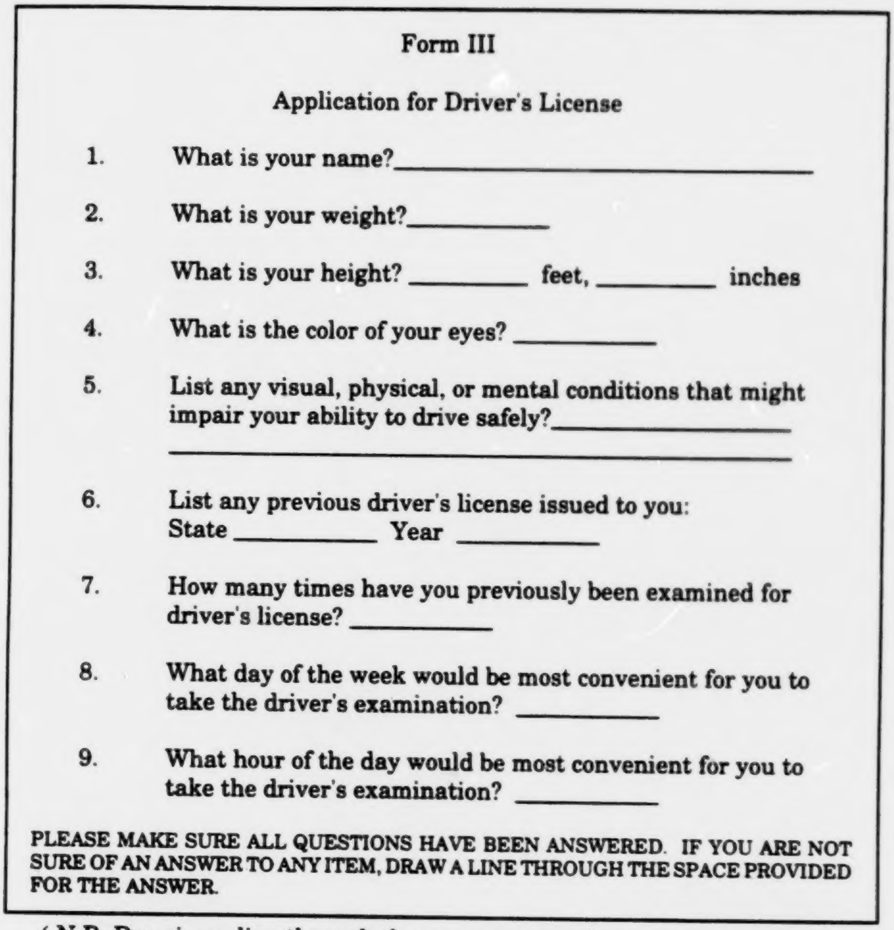
Figures 31 and 32 show two of the forms and the responses in percent correct for adults having three levels of education. As indicated in figure 32, the Medicaid form was particularly difficult, with only 54 percent of those with an 8th grade education or less getting 90-100 percent correct. Even many college educated adults had trouble completing the Medicaid form.

FIGURE 30 Harris and Associates Survival Literacy Study - 1970



Source: Congressional Record, November 18, 1970, Page E9722, Chart XVIII.

FIGURE 31 Harris and Associates Survival Literacy Study - 1970



Form III

Application for Driver's License

1. What is your name?______________________________

2. What is your weight?__________

3. What is your height? ________ feet, ________ inches

4. What is the color of your eyes? __________

5. List any visual, physical, or mental conditions that might impair your ability to drive safely?________________

6. List any previous driver's license issued to you:
State __________ Year __________

7. How many times have you previously been examined for driver's license? __________

8. What day of the week would be most convenient for you to take the driver's examination? __________

9. What hour of the day would be most convenient for you to take the driver's examination? __________

PLEASE MAKE SURE ALL QUESTIONS HAVE BEEN ANSWERED. IF YOU ARE NOT SURE OF AN ANSWER TO ANY ITEM, DRAW A LINE THROUGH THE SPACE PROVIDED FOR THE ANSWER.

(N.B. Drawing a line through the space was consider a correct answer.)

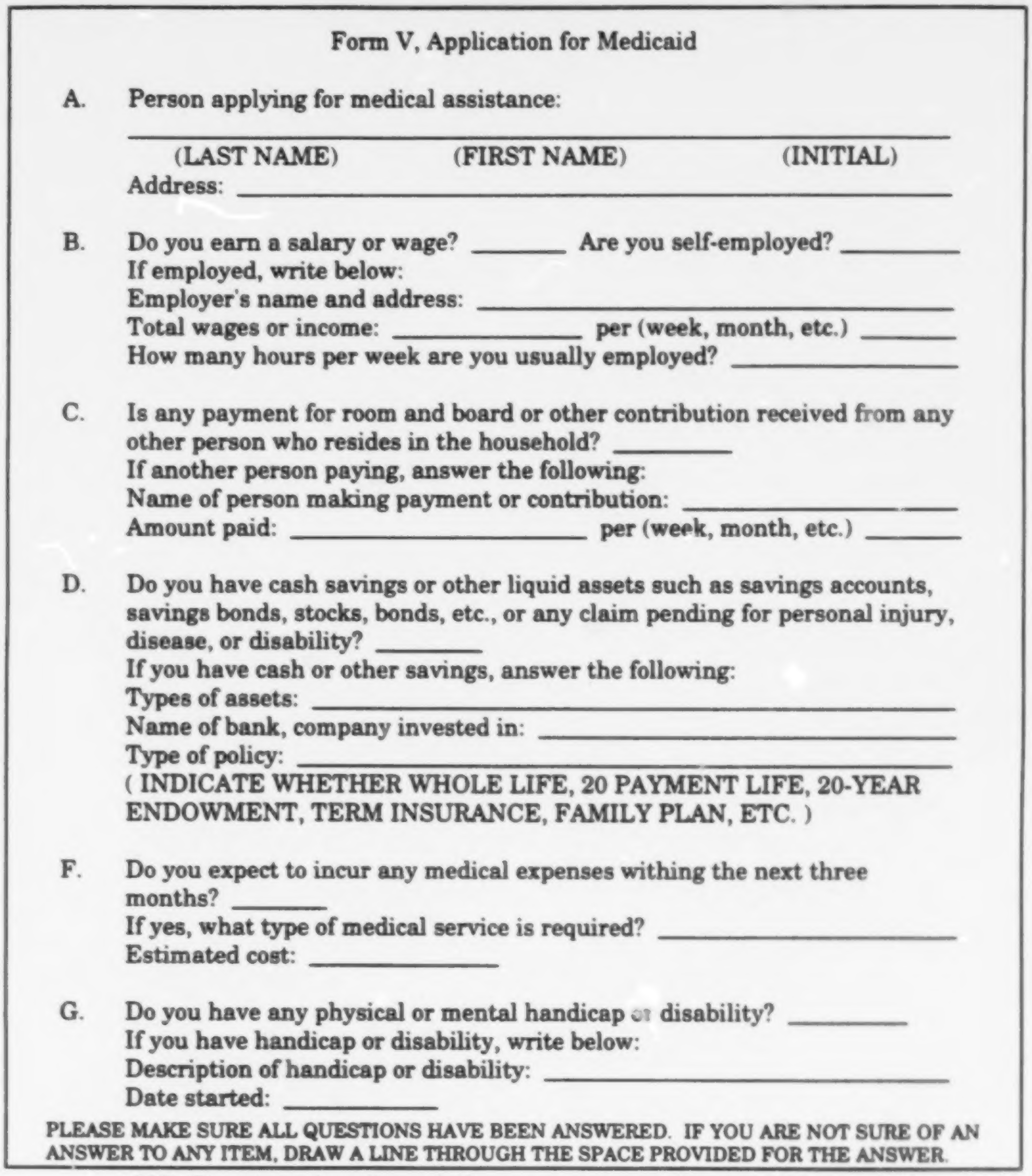
Source: L. C. Steadman and C. F. Kaestle (1986, May). An investigation of crude literacy, reading performance, and functional literacy in the United States, 1880 to 1980. Madison, WI: Wisconsin Center for Education Research, School of Education, University of Wisconsin - Madison. p. 100.

	Years of Education		
Percent Correct Score Range	8th grade or less	High School	College
90 - 100	83[a]	92	96
80 - 89	9	5	2
70 - 79	4	2	1

[a] Percentage of respondents falling in the given percent correct score range

Source: Congressional Record, November 18, 1970, Page E9722, Chart XVIII.

FIGURE 32 | **Harris and Associates Survival Literacy Study - 1970**



Form V, Application for Medicaid

A. Person applying for medical assistance:

____

(LAST NAME) (FIRST NAME) (INITIAL)

Address: ______________________________

B. Do you earn a salary or wage? ________ Are you self-employed? ________

If employed, write below:

Employer's name and address: ______________________________

Total wages or income: ______________ per (week, month, etc.) ________

How many hours per week are you usually employed? ______________

C. Is any payment for room and board or other contribution received from any other person who resides in the household? ________

If another person paying, answer the following:

Name of person making payment or contribution: ______________

Amount paid: ____________________ per (week, month, etc.) ________

D. Do you have cash savings or other liquid assets such as savings accounts, savings bonds, stocks, bonds, etc., or any claim pending for personal injury, disease, or disability? ________

If you have cash or other savings, answer the following:

Types of assets: ______________________________

Name of bank, company invested in: ______________________________

Type of policy: ______________________________

(INDICATE WHETHER WHOLE LIFE, 20 PAYMENT LIFE, 20-YEAR ENDOWMENT, TERM INSURANCE, FAMILY PLAN, ETC.)

F. Do you expect to incur any medical expenses withing the next three months? ________

If yes, what type of medical service is required? ______________

Estimated cost: ______________

G. Do you have any physical or mental handicap or disability? ________

If you have handicap or disability, write below:

Description of handicap or disability: ______________________________

Date started: ____________

PLEASE MAKE SURE ALL QUESTIONS HAVE BEEN ANSWERED. IF YOU ARE NOT SURE OF AN ANSWER TO ANY ITEM, DRAW A LINE THROUGH THE SPACE PROVIDED FOR THE ANSWER.

(N.B. Drawing a line through the space was consider a correct answer.)

Source: D.L. Fisher (1978, January). Functional literacy and the schools. Washington, DC: U.S. Department of Health, Education and Welfare, National Institute of Education, p. 42.

Percent Correct Score Range	Years of Education 8th grade or less	 High School	 College
90 - 100	54[a]	66	74
80 - 89	17	17	16
70 - 79	9	9	6

[a] Percentage of respondents falling in the given percent correct score range

Source: Congressional Record, November 18, 1970, Page E9722, Chart XVIII.

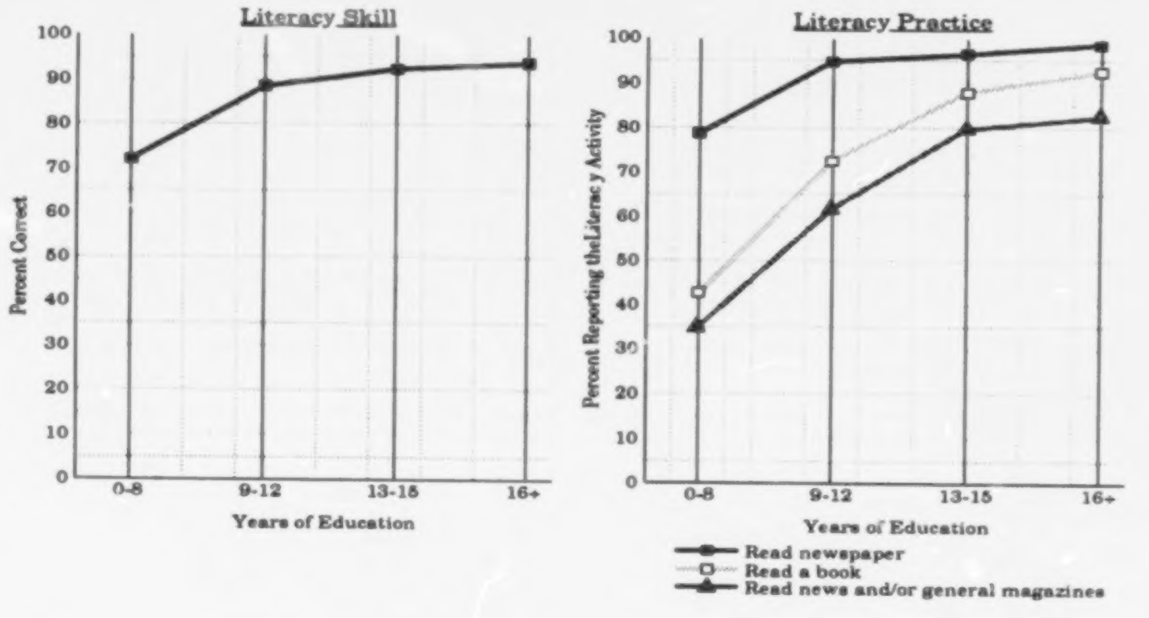
Adult Functional Reading Study - 1973

The first part of the Adult Functional Reading Study conducted household interviews to determine what kinds of literacy practices engage adults. In the second part of the study literacy tasks were developed and administered to assess the literacy skills of a second household sample. Data from the two parts of the study are summarized in Figure33.

Though 170 items were administered in the study, only five items were released to the public. The data for literacy skills based solely on the five items are presented Figure 33. The five items themselves are given in Figures 34, 35, and 36. Over all 170 items, over 70 percent of the respondents scored 70 percent correct or better. As a trend, better educated adults performed better on the test than less well educated adults, and whites tended to perform better than blacks.

As with Buswell's (p. 43) study, both literacy skills and literacy practices are seen to increase as a function of extent of education. Book and magazine reading were more highly related to years of education than was newspaper reading. Altogether, the adults reported that they spent about 90 minutes a day in reading one or another type of materials (including such things as forms, labels, signs, bills, mail, etc.).

FIGURE 33 **Adult Functional Reading Study - 1973**

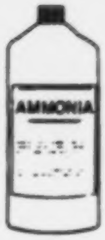


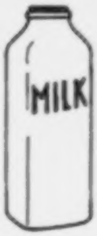
Source: R.T. Murphy (1975). Assessment of Adult Reading Competence: D. Nielsen and H. Hjelm (Eds.). Reading and Career Education. Newark, DE: International Reading Association. Data presented are from table 3 and are averages for the five items at each education level in the table (p. 57).

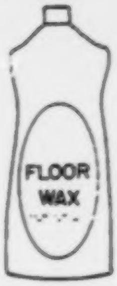
Source: R.T. Murphy (1973, December). Adult Functional Reading Study. Appendix A. Report PR 73-48. Princeton, NJ: Educational Testing Service. p. 1, table 2.2. Data for magazines is the average for news and general magazines reported in table 2.2.

FIGURE 34 AFRS - Test Items

Item 1: Oral Directions: Place a circle around the bottle of liquid that would be safe to drink.







Years of Education	0 - 8	9 - 12	13 - 15	16 +
Percent Correct	99.3	100	100	100

Source: R.T. Murphy (1975). Assessment of Adult Reading Competence: D. Nielsen and H. Hjelm (Eds.). Reading and Career Education. Newark, DE: International Reading Association. (p. 57).

Item 2: Oral Directions: Place a circle around the label that would be the best one to put on a box used to mail something easily broken.

PERISHABLE - KEEP REFRIGERATED

SPECIAL DELIVERY

THIS END UP

FRAGILE - HANDLE WITH CARE

CONFIDENTIAL

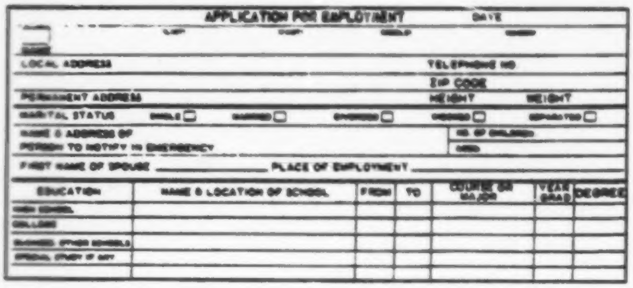
AIR PARCEL POST

Years of Education	0 - 8	9 - 12	13 - 15	16 +
Percent Correct	83.1	98.5	99.3	97.5

Source: R.T. Murphy (1975). Assessment of Adult Reading Competence: D. Nielsen and H. Hjelm (Eds.). Reading and Career Education. Newark, DE: International Reading Association. (p. 58).

FIGURE 35 | AFRS - Test Items

Item 3: Oral Directions: Look at the application for employment. Put an X in the space where you would write the name of someone to notify in case of emergency.



APPLICATION FOR EMPLOYMENT DATE

LOCAL ADDRESS TELEPHONE NO

ZIP CODE

PERMANENT ADDRESS HEIGHT WEIGHT

MARITAL STATUS SINGLE ☐ MARRIED ☐ DIVORCED ☐ WIDOWED ☐ SEPARATED ☐

NAME & ADDRESS OF PERSON TO NOTIFY IN EMERGENCY NO. OF CHILDREN AGES

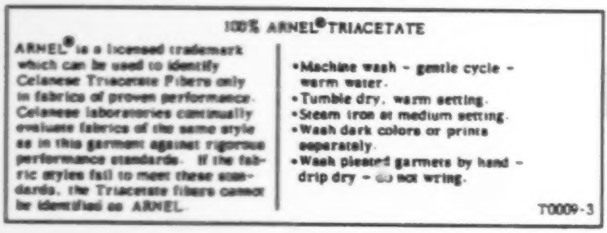
FIRST NAME OF SPOUSE ______ PLACE OF EMPLOYMENT ______

EDUCATION	NAME & LOCATION OF SCHOOL	FROM	TO	COURSE OR MAJOR	YEAR GRAD	DEGREE
HIGH SCHOOL						
COLLEGE						
BUSINESS, OTHER SCHOOLS						
SPECIAL STUDY IF ANY						

Years of Education	0 - 8	9 - 12	13 - 15	16 +
Percent Correct	77.3	95.3	97.9	99.0

Source: R.T. Murphy (1975). Assessment of Adult Reading Competence: D. Nielsen and H. Hjelm (Eds.). Reading and Career Education. Newark, DE: International Reading Association. (p. 58).

Item 4: Oral Directions: Look at the garment tags. Circle the two tags that indicate the garments are made from 100% Polyester.



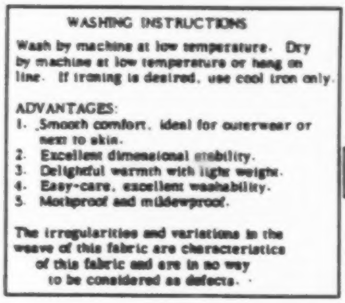
100% ARNEL® TRIACETATE

ARNEL® is a licensed trademark which can be used to identify Celanese Triacetate Fibers only in fabrics of proven performance. Celanese laboratories continually evaluate fabrics of the same style as in this garment against rigorous performance standards. If the fabric styles fail to meet these standards, the Triacetate fibers cannot be identified as ARNEL.

- Machine wash - gentle cycle - warm water.
- Tumble dry, warm setting.
- Steam iron at medium setting.
- Wash dark colors or prints separately.
- Wash pleated garments by hand - drip dry - do not wring.

T0009-3

A



WASHING INSTRUCTIONS

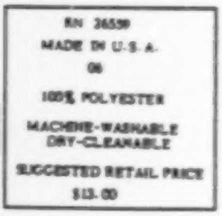
Wash by machine at low temperature. Dry by machine at low temperature or hang on line. If ironing is desired, use cool iron only.

ADVANTAGES:
1. Smooth comfort, ideal for outerwear or next to skin.
2. Excellent dimensional stability.
3. Delightful warmth with light weight.
4. Easy-care, excellent washability.
5. Mothproof and mildewproof.

The irregularities and variations in the weave of this fabric are characteristics of this fabric and are in no way to be considered as defects.

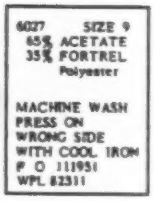
D

E



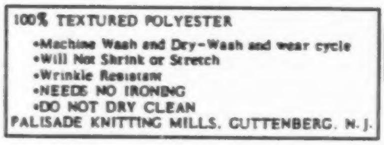
RN 26539
MADE IN U.S.A.
06
100% POLYESTER
MACHINE-WASHABLE
DRY-CLEANABLE
SUGGESTED RETAIL PRICE
$13.00

C



6027 SIZE 9
65% ACETATE
35% FORTREL
Polyester

MACHINE WASH
PRESS ON
WRONG SIDE
WITH COOL IRON
P O 111951
WPL 82311



100% TEXTURED POLYESTER
- Machine Wash and Dry-Wash and wear cycle
- Will Not Shrink or Stretch
- Wrinkle Resistant
- NEEDS NO IRONING
- DO NOT DRY CLEAN

PALISADE KNITTING MILLS, GUTTENBERG, N.J.

B

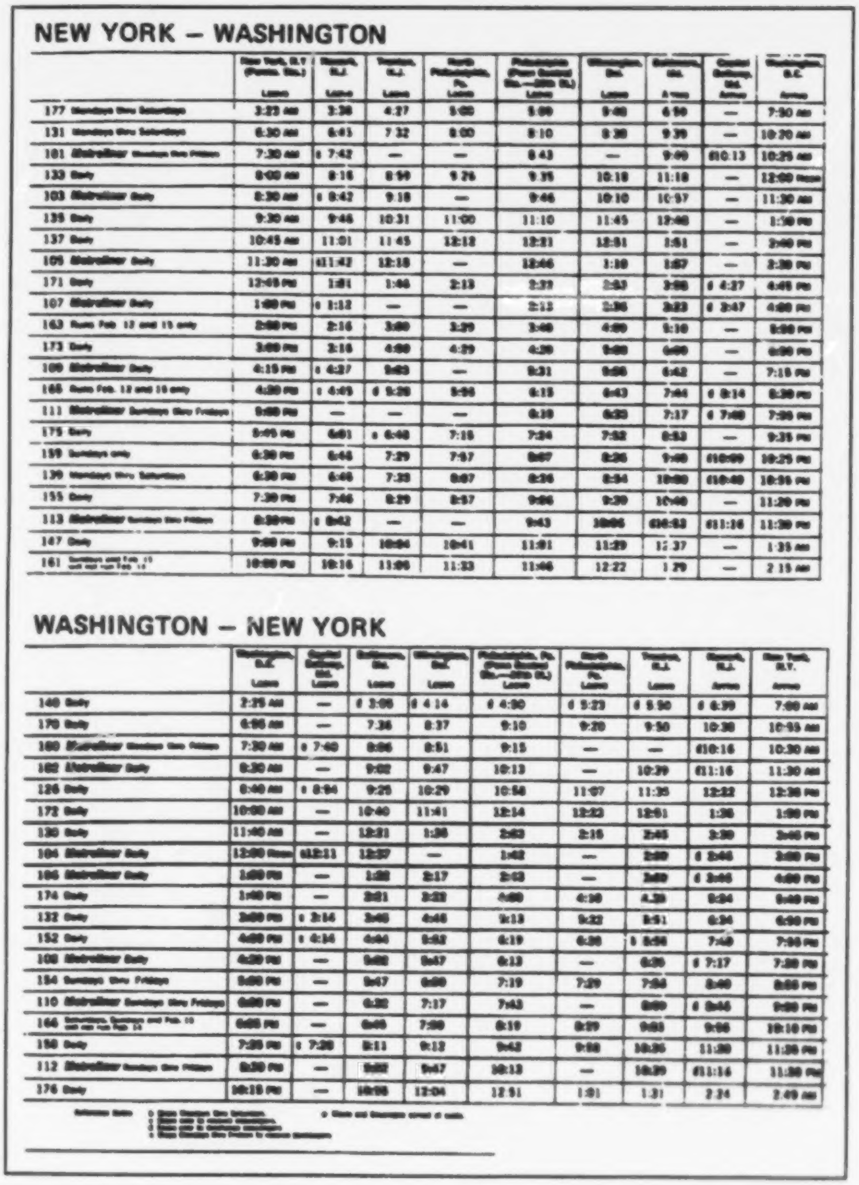
Years of Education	0 - 8	9 - 12	13 - 15	16 +
Percent Correct	66.6	82.4	90.4	91.4

Source: R.T. Murphy (1975). Assessment of Adult Reading Competence: D. Nielsen and H. Hjelm (Eds.). Reading and Career Education. Newark, DE: International Reading Association. (p. 59).

BEST COPY AVAILABLE

FIGURE 36	**AFRS - Test Items**

Item 5: Oral Directions: Look at the train schedules. Put a circle around the time the daily train leaving Trenton at 1:46 p.m. arrrives in Washington.



NEW YORK – WASHINGTON

WASHINGTON – NEW YORK

Years of Education	0 - 8	9 - 12	13 - 15	16 +
Percent Correct	40.1	68.7	76.5	80.1

Source: R.T. Murphy (1975). Assessment of Adult Reading Competence: D. Nielsen and H. Hjelm (Eds.). Reading and Career Education. Newark, DE: International Reading Association. (p. 60).

BEST COPY AVAILABLE

The Adult Performance Level Study

The Adult Performance Level (APL) study began in 1971 as a project funded by the U. S. Office of Education. It introduced the concept of "competency-based" education to the field of adult basic education. The term "competency-based" meant that adult basic education was to be focussed on achieving measurable outcomes. By 1977, when the project was completed, two-thirds of the states had implemented some form of "competency-based" adult basic education. An overview and critique of the APL project is presented by Fischer, Haney and David (1980).

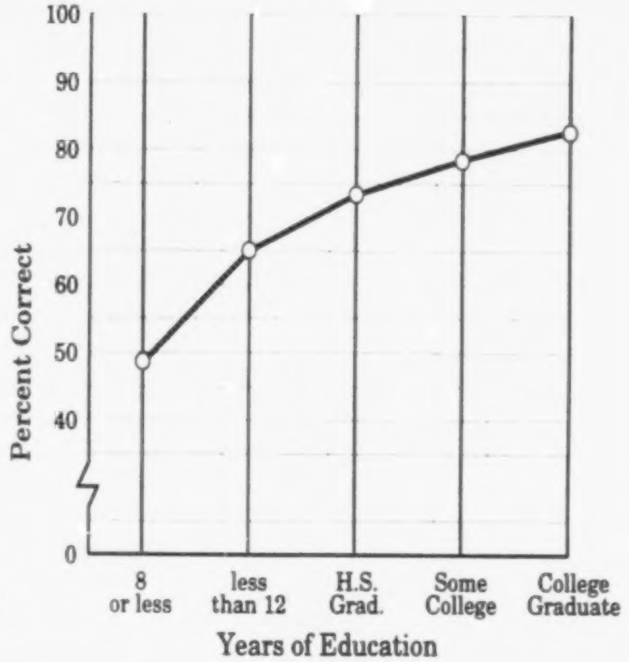
Test items that were included in the final (unpublished) report of the APL project are reproduced on pages 68 through 97. Each item shows what the examiner said and what the respondent did. For instance, in Figure 38, Item 1, the examiner gave the respondent a card with a sign on it about the ABC Company. The examiner says, orally, "Here's a notice that's on a company bulletin board. Please read the notice to me." The respondent then reads the sign out loud. This procedure is followed on each item. That is, the instructions are given orally, and the respondent looks at and reads some information display and makes a response.

For each item, information is given showing the national average percent getting the item correct, and then the average percent correct obtained by adults with different years of education. Figure 37, below, presents the average percent correct scores over all items for adults at the different levels of education.

Reference

Joan Fischer, Walt Haney, & Lloyd David (September, 1980). *APL Revisited: Its Uses and Adaptation in States.* Washington, DC: National Institute of Education, Office of Educational Research and Improvement, U. S. Department of Education.

FIGURE 37 **Adult Performance Level Study (Literacy Skill)**



Source: "The Adult Performance Level Study: A report submitted to the Office of Education Dissemination Review Panel." Undated but labelled in handwriting "O.K. 3/25/75."

FIGURE 38 APL - Test Items

ITEM 1: **Part 1.** Examiner says:
"Here's a notice that's on a company bulletin board. Please read the notice to me."

ABC
COMPANY
We are an Equal
Opportunity Employer

	National Average	Years of Education: 8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
Percent Correct:	93	78	93	95	98	98

ITEM 1: **Part 2.** Examiner says, as respondent reads along:

"This notice means:

1 all people working in the firm are given equal consideration

2 discrimination has not occurred within the firm

3 you don't have to meet job requirements in order to apply for that job

• 4 employment applications will be considered without regard to race, creed, sex, or national origin."

	National Average	Years of Education: 8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
Percent Correct:	80	57	72	85	90	90

Source: "The Adult Performance Level Study: A report submitted to the Office of Education Dissemination Review Panel." Undated but labelled in handwriting "O.K. 3/25/75."

FIGURE 39 APL - Test Items

ITEM 2: Examiner says: "Look at the notice that is posted at the cashier's desk in a store."

Check Cashing

$ .01	-	$ 10.00	Charge of $ .15
$ 10.01	-	$ 50.00	Charge of $ .20
$ 50.01	-	$ 75.00	Charge of $ .25
$ 75.01	-	$ 100.00	Charge of $ .30

No checks over $100.00 cashed
No 2-party checks

"The notice means that if someone writes you a check for $120.00, the store will cash it:

1 for 30¢

2 for a special price

* 3 under no circumstances

4 if you buy something."

		Years of Education				
	National Average	8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
Percent Correct:	77	54	70	80	88	93

ITEM 3: Examiner says: "According to the Constitution, permission to have peaceful public meetings should be given to:

* 1 all groups

2 most groups, if they are not too radical

3 a few groups that will not cause trouble

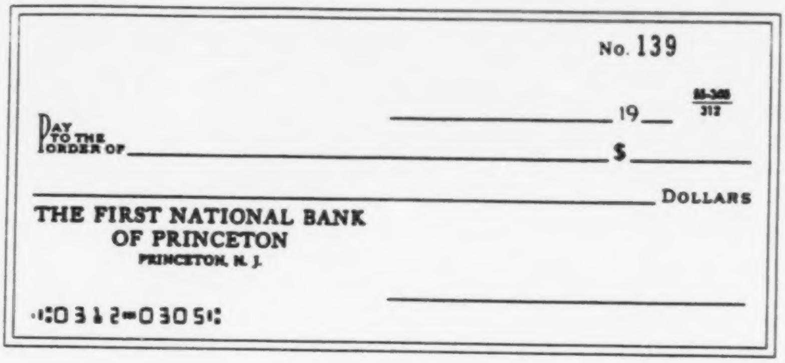
4 government approved groups only."

		Years of Education				
	National Average	8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
Percent Correct:	88	76	86	89	94	93

Source: "The Adult Performance Level Study: A report submitted to the Office of Education Dissemination Review Panel." Undated but labelled in handwriting "O.K. 3/25/75."

FIGURE 40 APL - Test Items

ITEM 4: Examiner says: "Jean Rankin is going to buy a pair of shoes today at the Justin Shoe Store. The cost of the shoes including the sales tax is $8.16. She is going to pay for the shoes with a check. Fill out the sample check as Jean Rankin would."



No. 139

_______________ 19__ 55-305/312

PAY TO THE ORDER OF ______________________ $________

______________________________ DOLLARS

THE FIRST NATIONAL BANK
OF PRINCETON
PRINCETON, N. J.

____

⑆0312⑉0305⑆

	National Average	Years of Education: 8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
Percent Correct:	86	56	85	98	93	94

Source: "The Adult Performance Level Study: A report submitted to the Office of Education Dissemination Review Panel." Undated but labelled in handwriting "O.K. 3/25/75."

FIGURE 41 APL - Test Items

ITEM 5: Examiner says: "The House of Representatives is going to vote on H.B. 74-891. The Bill will reduce the amount of Social Security paid to women over 65. John Frask is against the Bill. Finish this letter that he will send to his U.S. Representative, whose name is Henry Sanchez."

321 Sunshine Street
Boulder, Colorado 62510
November 26, 1973

Henry Sanchez
U.S. Representative
House of Representatives
Washington, D.C.

Dear Mr. Sanchez:

Very soon the House of Representatives will vote

on ______*(Correct response: H. B. 74-891)*______.

I am strongly opposed to this bill; therefore,

I urge you to ______*(Correct response: vote against)*______.

Sincerely yours,

John Frask

John Frask

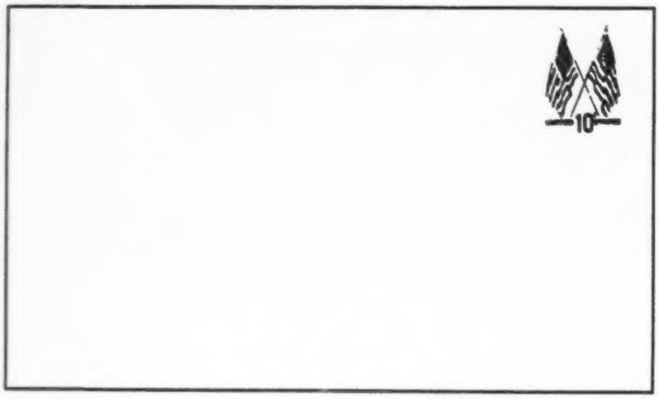
Percent Correctly Entering	National Average	Years of Education				
		8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
"H.B. 74-891":	87	58	85	92	96	97
"vote against":	80	57	74	84	89	93

Source: "The Adult Performance Level Study: A report submitted to the Office of Education Dissemination Review Panel." Undated but labelled in handwriting "O.K. 3/25/75."

FIGURE 42 | APL - Test Items

ITEM 6: Examiner says: "Pretend that you are Jack Youngtree. You live at 444 Dogwood Lane, Apple Blossom, Vermont, 05111. You want to write a letter to Mr. Sam Wood, editor of the Blahtown Daily News in Blahtown, Vermont, 05112.

Address the envelope for Jack."



Percent Correctly Entering	National Average	Years of Education: 8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
"Return Address":	76	42	75	82	85	85
"Addressee's Address":	87	56	86	93	96	96

Source: "The Adult Performance Level Study: A report submitted to the Office of Education Dissemination Review Panel." Undated but labelled in handwriting "O.K. 3/25/75."

Figure 43 APL - Test Items

ITEM 7: Examiner says: "Swimming lessons offered at the YWCA cost $100 for a six-week course for the first child and $75 for each additional child in the same family. Mrs. Hare has 5 children and wants all of them to take the lessons. How much will she have to pay?" (Correct response: $400).

Note: Respondent reads along with examiner and can refer to written display.

	National Average	Years of Education				
		8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
Percent Correct:	79	53	74	84	87	93

ITEM 8: Examiner says: "Joe is 45 years old, is married, and has three children to support. Which job characteristic would Joe be most attracted to?"

1 high commissions

2 little experience required

3 group medical plan offered

* 4 good job security

Note: Respondent reads along with examiner and can refer to written display.

	National Average	Years of Education				
		8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
Percent Correct:	82	73	80	83	86	91

Source: "The Adult Performance Level Study: A report submitted to the Office of Education Dissemination Review Panel." Undated but labelled in handwriting "O.K. 3/25/75."

FIGURE 44 APL - Test Items

ITEM 9: Examiner says: "Information about Mr. Reed's insurance policy is shown below

If Mr. Reed is admitted to a Non-member Hospital as a bedpatient, how much of the cost will he have to pay himself?" (Correct response: 25%).

Non-member Hospital Benefits

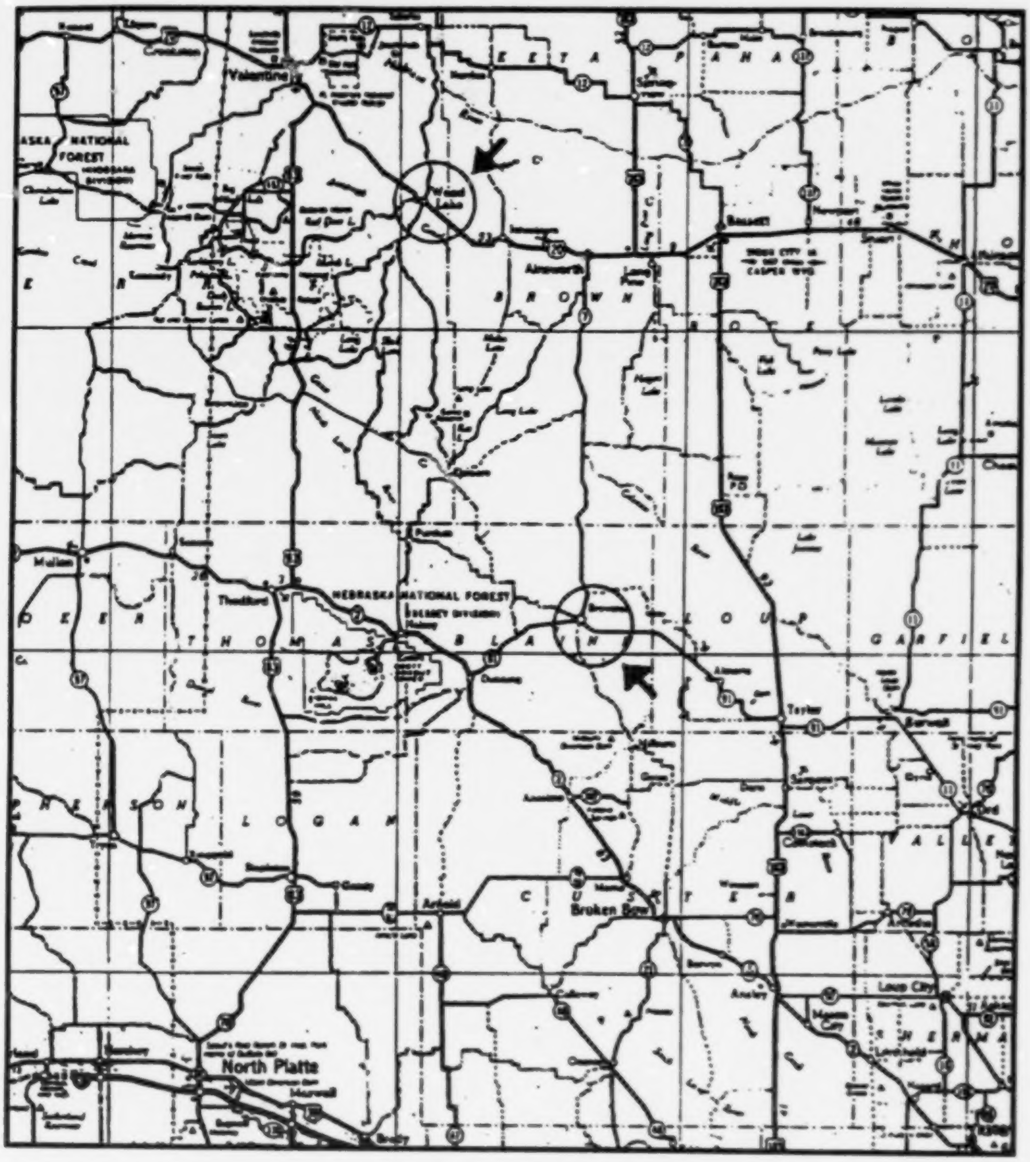
When any participant is admitted as a bedpatient in a Non-member Hospital, this insurance will provide benefits equal to 75% of the total value of the benefits which would have accrued if the same care had been furnished by a Member Hospital. For out-patient care, the benefits are the same as in a Member Hospital.

		Years of Education				
	National Average	8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
Percent Correct:	73	49	66	80	80	79

Source: "The Adult Performance Level Study: A report submitted to the Office of Education Dissemination Review Panel." Undated but labelled in handwriting "O.K. 3/25/75."

FIGURE 45 APL - Test Items

ITEM 10: Examiner says: "Mr. King wants to go from Wood Lake to Brewster. He is a stranger to Nebraska and he wants to take the most direct route. Name the town where he has to change from one highway to another." (Correct response: Ainsworth)


Valentine
Wood Lake
Ainsworth
Bassett
B R O W N
K E Y A P A H A
Thedford
Mullen
NEBRASKA NATIONAL FOREST
T H O M A S
B L A I N E
L O U P
G A R F I E L
Taylor
L O G A N
C U S T E R
Broken Bow
Arnold
V A L L E Y
Loup City
S H E R M A N
North Platte

		Years of Education				
	National Average	8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
Percent Correct:	86	64	82	90	93	96

Source: "The Adult Performance Level Study: A report submitted to the Office of Education Dissemination Review Panel." Undated but labelled in handwriting "O.K. 3/25/75."

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FIGURE 46 APL - Test Items

ITEM 11: Examiner says: "Police have the authority to detain a person for as long as a week while deciding whether or not to bring charges against him

1 when they think it will produce a confession

2 when dealing with severe crimes

* 3 under no circumstances

4 when dealing with a previous offender."

	National Average	Years of Education				
		8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
Percent Correct:	66	47	56	69	77	80

ITEM 12: Examiner says: "Upton Sinclair's novel The Jungle exposed the unsanitary and unhealthful conditions in the meat packing industry. The public reaction to this scandal led to:

1 a meat boycott

2 censorship of his book

3 the President's resignation

* 4 the first food and drug legislation."

	National Average	Years of Education				
		8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
Percent Correct:	75	55	71	76	85	91

Source: "The Adult Performance Level Study: A report submitted to the Office of Education Dissemination Review Panel." Undated but labelled in handwriting "O.K. 3/25/75."

FIGURE 47 APL - Test Items

ITEM 13: Examiner says, as respondent reads along:

"Manuel makes $2.00 an hour and works a 40-hour week. He is paid time and a half for overtime. How much would he earn if he worked 43 hours one week?"
(Correct response: $89.00)

		Years of Education				
	National Average	8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
Percent Correct:	71	58	65	72	77	86

ITEM 14: Examiner says, as respondent reads along:

"It is the beginning of a new year. Mary Percy has decided that this year she is going to save the records that are needed for income tax purposes. Which one of the following items should she keep, assuming that there is not state sales tax?

* 1 receipt from B.J. Smith, M.D.

2 receipt for car safety equipment required by federal government

3 sales tag from a winter coat

4 cancelled check paid to a local supermarket or grocery store."

		Years of Education				
	National Average	8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
Percent Correct:	81	69	77	83	83	89

ITEM 15: Examiner says, as respondent reads along:

"Mr. Threadgill is having his yearly physical check-up. The nurse says his temperature is normal. What is the normal human temperature?"
(Correct response: 98.6)

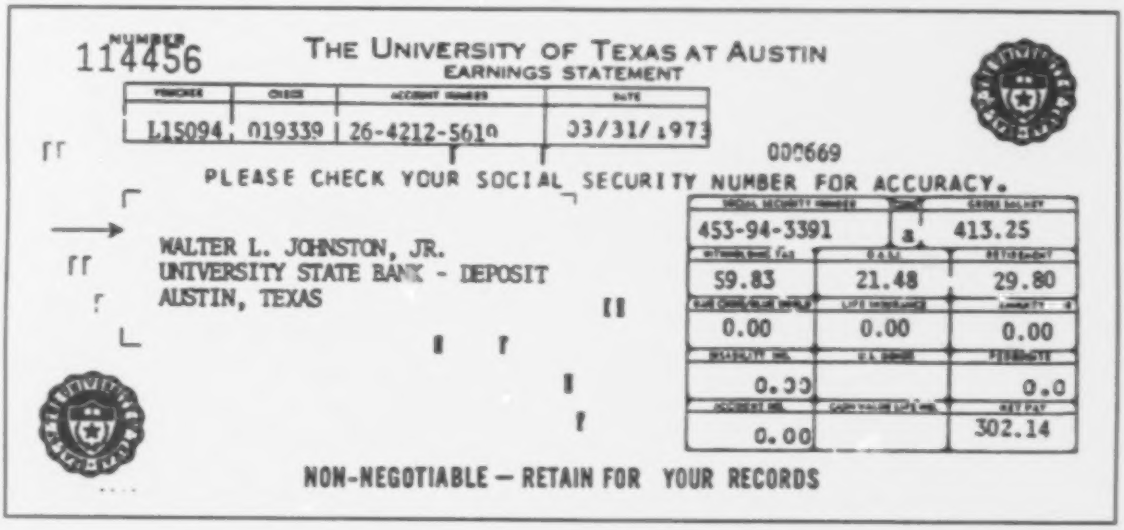
		Years of Education				
	National Average	8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
Percent Correct:	73	50	66	77	82	86

Source: "The Adult Performance Level Study: A report submitted to the Office of Education Dissemination Review Panel." Undated but labelled in handwriting "O.K. 3/25/75."

FIGURE 48 APL - Test Items

ITEM 16: Examiner says, as respondent reads along:
"Look at the Earnings Statement and answer the questions."

Examiner Does Not Read These To Respondent	Part 1.	Altogether, how much money was deducted from Walter Johnston's pay? (Correct response: $111.11)
	Part 2.	How much of his pay was deducted for income tax? (Correct response: $59.83)
	Part 3.	How much was deducted for social security?" (Correct response: $21.48)



NUMBER 114456

THE UNIVERSITY OF TEXAS AT AUSTIN
EARNINGS STATEMENT

VOUCHER	CHECK	ACCOUNT NUMBER	DATE
L15094	019339	26-4212-5610	03/31/1973

000669

PLEASE CHECK YOUR SOCIAL SECURITY NUMBER FOR ACCURACY.

WALTER L. JOHNSTON, JR.
UNIVERSITY STATE BANK - DEPOSIT
AUSTIN, TEXAS

453-94-3391	a	413.25
59.83	21.48	29.80
0.00	0.00	0.00
0.00		0.0
0.00		302.14

NON-NEGOTIABLE — RETAIN FOR YOUR RECORDS

Percent Correct:		National Average	8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
			Years of Education				
	Part 1.	83	63	80	87	88	93
	Part 2.	91	77	90	94	95	96
	Part 3.	74	65	70	75	76	84

Source: "The Adult Performance Level Study: A report submitted to the Office of Education Dissemination Review Panel." Undated but labelled in handwriting "O.K. 3/25/75."

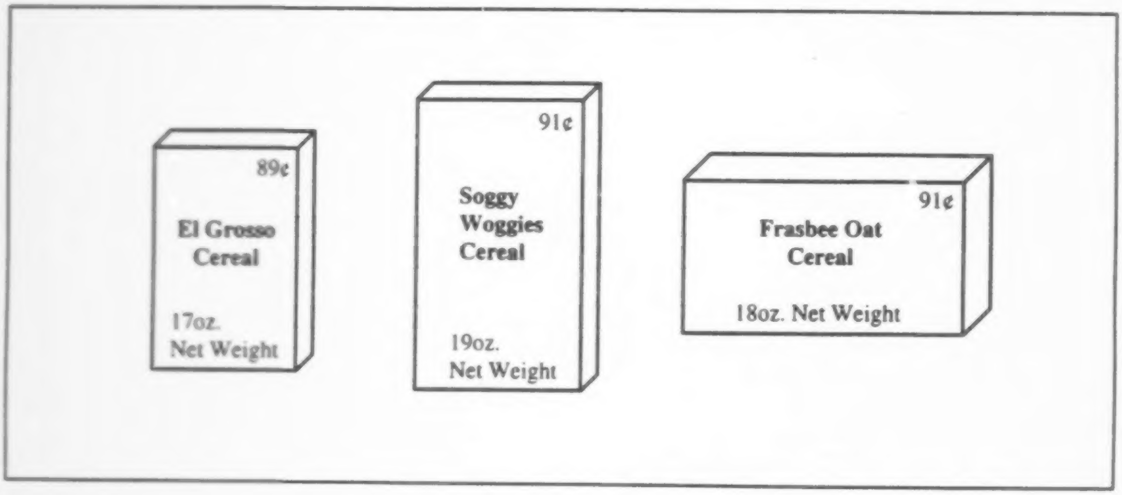
FIGURE 49 APL - Test Items

ITEM 17: Examiner says, as respondent reads along:

"Below are three boxes of cereal. On each box is printed the price and the weight. Look at the prices and weights and then answer the two questions below.

Part 1. Which one of the three boxes of cereal contains the most cereal by weight? (Correct response: second)

Part 2. Which one of the three boxes of cereal is the best buy?" (Correct response: second)


89¢
El Grosso Cereal
17oz. Net Weight
91¢
Soggy Woggies Cereal
19oz. Net Weight
91¢
Frasbee Oat Cereal
18oz. Net Weight

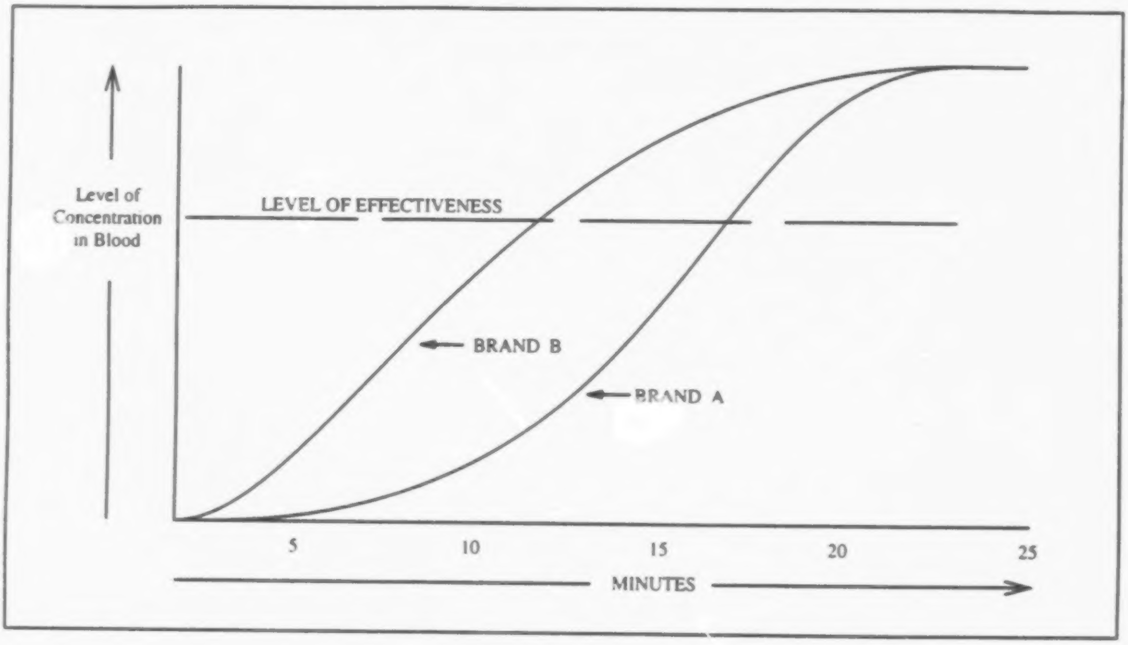
		National Average	Years of Education: 8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
Percent Correct:	Part 1.	96	88	96	97	97	99
	Part 2.	74	65	68	76	79	81

Source: "The Adult Performance Level Study: A report submitted to the Office of Education Dissemination Review Panel." Undated but labelled in handwriting "O.K. 3/25/75."

FIGURE 50 — APL - Test Items

ITEM 18: Examiner says, as respondent reads along:

"Here is a graph showing the effectiveness of two brands of a common pain reliever. Which brand is more effective after 25 minutes?"
(Correct response: both, neither, no difference, same)



	National Average	Years of Education				
		8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
Percent Correct:	67	41	62	67	82	90

Source: "The Adult Performance Level Study: A report submitted to the Office of Education Dissemination Review Panel." Undated but labelled in handwriting "O.K. 3/25/75."

FIGURE 51 APL - Test Items

ITEM 19: Examiner says, as respondent reads along:

"When Mrs. Garibaldi went to the store, she found that tuna, macaroni, peaches, and spinach were on sale. If she wants a high protein dinner, which one of these should she buy?

* 1 tuna

2 macaroni

3 peaches

4 spinach."

	National Average	Years of Education				
		8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
Percent Correct:	71	56	69	69	76	88

ITEM 20: Examiner says, as respondent reads along:

"Mr. Roger's monthly paycheck before deductions is $400.00. Each month, $20.00 is deducted for Social Security and $60.00 for withholding tax. How much is his yearly take home pay?"

(Correct response: $3840)

	National Average	Years of Education				
		8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
Percent Correct:	71	49	61	75	80	86

Source: "The Adult Performance Level Study: A report submitted to the Office of Education Dissemination Review Panel." Undated but labelled in handwriting "O.K. 3/25/75."

FIGURE 52 APL - Test Items

ITEM 21: Examiner says, as respondent reads along:

"Tim Brown missed a day of school because of a sore throat.
Write a note to his teacher, Mrs. Drake, asking that Tim's absence be excused."

Part 1: Salutation

Part 2: Message

Part 3: Who is excused

Part 4: Signature

		National Average	Years of Education				
			8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
Percent Correct:	Part 1.	78	56	80	81	85	87
	Part 2.	93	77	95	96	97	97
	Part 3.	93	75	95	97	96	97
	Part 4.	71	51	71	74	78	79

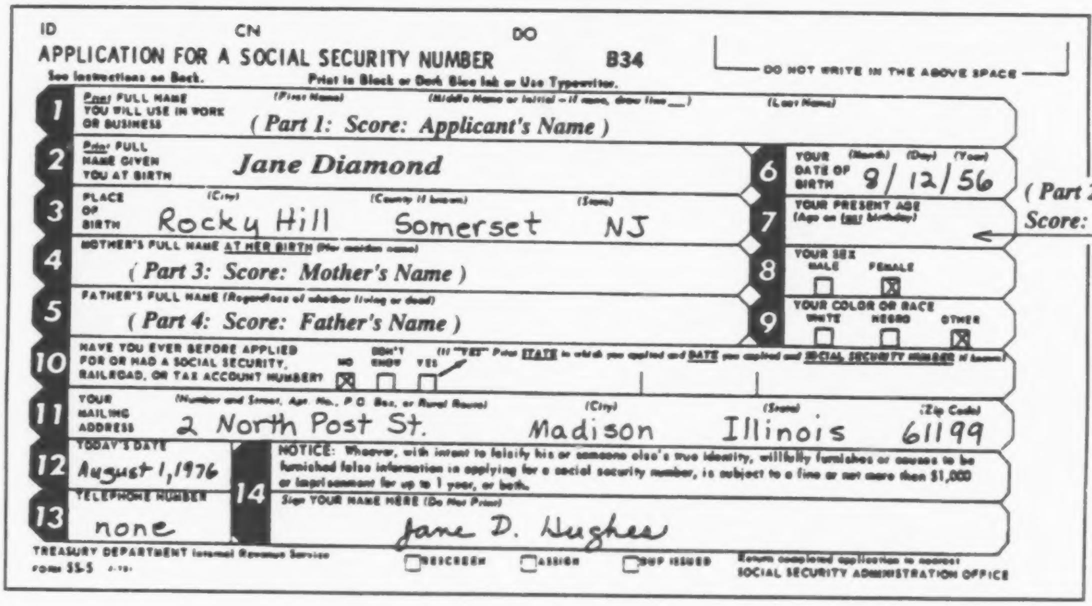
Source: "The Adult Performance Level Study: A report submitted to the Office of Education Dissemination Review Panel." Undated but labelled in handwriting "O.K. 3/25/75."

FIGURE 53 — APL - Test Items

ITEM 22: Examiner says, as respondent reads along:

> "You are Jane D. Hughes and you are applying for a social security number for the first time. You are 18 years old. Your mother's maiden name was Mary Jane Davidson and your father is John Blair Diamond. Fill out the missing information on the form."

Score 4 Parts:
1. Applicant's Name   2. Applicant's Age   3. Mother's Name   4. Father's Name



ID CN DO

APPLICATION FOR A SOCIAL SECURITY NUMBER B34

DO NOT WRITE IN THE ABOVE SPACE

See Instructions on Back. Print in Black or Dark Blue Ink or Use Typewriter.

1 Print FULL NAME YOU WILL USE IN WORK OR BUSINESS (First Name) (Middle Name or Initial – if none, draw line ___) (Last Name) *(Part 1: Score: Applicant's Name)*

2 Print FULL NAME GIVEN YOU AT BIRTH *Jane Diamond*

3 PLACE OF BIRTH (City) Rocky Hill (County if known) Somerset (State) NJ

4 MOTHER'S FULL NAME AT HER BIRTH (Her maiden name) *(Part 3: Score: Mother's Name)*

5 FATHER'S FULL NAME (Regardless of whether living or dead) *(Part 4: Score: Father's Name)*

6 YOUR DATE OF BIRTH (Month) (Day) (Year) 8/ 12/ 56

7 YOUR PRESENT AGE (Age on last birthday) ← *(Part 2: Score: Age)*

8 YOUR SEX MALE ☐ FEMALE ☒

9 YOUR COLOR OR RACE WHITE ☐ NEGRO ☐ OTHER ☒

10 HAVE YOU EVER BEFORE APPLIED FOR OR HAD A SOCIAL SECURITY, RAILROAD, OR TAX ACCOUNT NUMBER? NO ☒ DON'T KNOW ☐ YES ☐ (If "YES" Print STATE in which you applied and DATE you applied and SOCIAL SECURITY NUMBER if known)

11 YOUR MAILING ADDRESS (Number and Street, Apt. No., P.O. Box, or Rural Route) 2 North Post St. (City) Madison (State) Illinois (Zip Code) 61199

12 TODAY'S DATE August 1, 1976

13 TELEPHONE NUMBER none

14 NOTICE: Whoever, with intent to falsify his or someone else's true identity, willfully furnishes or causes to be furnished false information in applying for a social security number, is subject to a fine of not more than $1,000 or imprisonment for up to 1 year, or both.

Sign YOUR NAME HERE (Do Not Print) Jane D. Hughes

TREASURY DEPARTMENT Internal Revenue Service
FORM SS-5

☐ RESCREEN ☐ ASSIGN ☐ DUP ISSUED

Return completed application to nearest SOCIAL SECURITY ADMINISTRATION OFFICE

Percent Correct:		National Average	Years of Education: 8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
	Part 1.	83	56	80	89	90	90
	Part 2.	61	32	61	64	69	74
	Part 3.	88	61	90	92	95	97
	Part 4.	82	51	83	87	90	91

Source: "The Adult Performance Level Study: A report submitted to the Office of Education Dissemination Review Panel." Undated but labelled in handwriting "O.K. 3/25/75."

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FIGURE 54 APL - Test Items

ITEM 23: Examiner says, as respondent reads along:
"What is a credit check?

1 a check given as a monthly payment

* 2 a check to see if you pay your bills

3 a check on your bank account balance

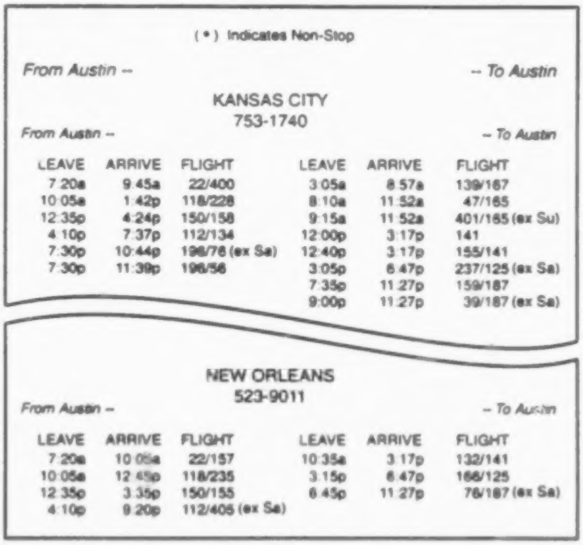
4 a substitute for money."

	National Average	Years of Education: 8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
Percent Correct:	74	54	70	77	79	87

ITEM 24: Examiner says, as respondent reads along:

Part 1. "Mr. Johnston from Austin needs to fly to Kansas City for a noon meeting on Tuesday. What flight must he take in order to be there on time?" (Correct response: (22/400) or (7:20am))

Part 2. "If his meeting lasts an hour and a half, what is the first flight he can get leaving Kansas City for Austin?" (Correct response: (237/125) or (3:05pm))



(*) Indicates Non-Stop

From Austin -- -- To Austin

KANSAS CITY
753-1740

From Austin -- -- To Austin

LEAVE	ARRIVE	FLIGHT	LEAVE	ARRIVE	FLIGHT
7:20a	9:45a	22/400	3:05a	8:57a	139/187
10:05a	1:42p	118/228	8:10a	11:52a	47/165
12:35p	4:24p	150/158	9:15a	11:52a	401/165 (ex Su)
4:10p	7:37p	112/134	12:00p	3:17p	141
7:30p	10:44p	198/76 (ex Sa)	12:40p	3:17p	155/141
7:30p	11:39p	198/56	3:05p	6:47p	237/125 (ex Sa)
			7:35p	11:27p	159/187
			9:00p	11:27p	39/187 (ex Sa)

NEW ORLEANS
523-9011

From Austin -- -- To Austin

LEAVE	ARRIVE	FLIGHT	LEAVE	ARRIVE	FLIGHT
7:20a	10:05a	22/157	10:35a	3:17p	132/141
10:05a	12:45p	118/235	3:15p	6:47p	166/125
12:35p	3:35p	150/155	6:45p	11:27p	76/187 (ex Sa)
4:10p	9:20p	112/405 (ex Sa)			

Note: Form shortened from original.

		National Average	Years of Education: 8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
Percent Correct:	Part 1.	70	39	63	74	85	82
	Part 2.	67	43	60	68	85	84

Source: "The Adult Performance Level Study: A report submitted to the Office of Education Dissemination Review Panel." Undated but labelled in handwriting "O.K. 3/25/75."

FIGURE 55 APL - Test Items

ITEM 25: Examiner says, as respondent reads along:
"When a person has the "right of way" in traffic, it means:

1 he must stay in the right hand lane

2 he has the right to turn in any direction he chooses

3 he should use his right turn signal

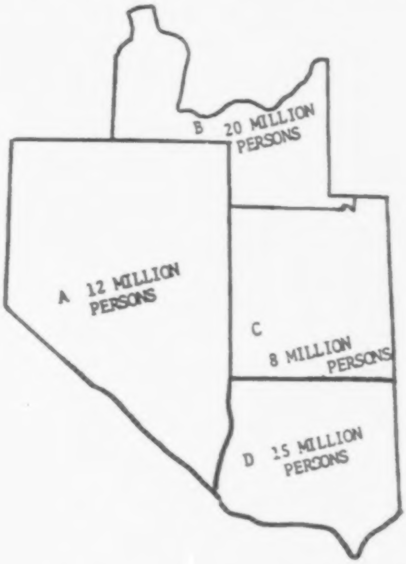
* 4 he does not have to yield to cross traffic."

	National Average	Years of Education				
		8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
Percent Correct:	70	45	63	72	84	92

ITEM 26: Examiner says, as respondent reads along:
"Shown here are 4 imaginary states.

Part 1. Which state has the most representatives in Congress? (Correct response: State B)

Part 2. Which state has the most senators in Congress?" (Correct response: "all have same or like amount")



		National Average	Years of Education				
			8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
Percent Correct:	Part 1.	86	68	80	90	95	97
	Part 2.	51	26	37	49	69	85

Source: "The Adult Performance Level Study: A report submitted to the Office of Education Dissemination Review Panel." Undated but labelled in handwriting "O.K. 3/25/75."

FIGURE 56 APL - Test Items

ITEM 27: Examiner says, as respondent reads along:

"Open shop" is a term which means:

1 the shop is open 24 hours a day

2 members of any race can work here

* 3 no one has to join a union

4 customers can shop here without a membership."

	National Average	Years of Education 8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
Percent Correct:	67	43	55	72	75	90

ITEM 28: Examiner says, as respondent reads along:

"Mrs. Olson got the following receipt. How much change would she get back from a twenty dollar bill?"
(Correct response: $17.64)

GROVE PHARMACY
209 East 6th
Phone - 478-4863

$ 01.00 drB
$ 01.25 drB

$ 02.25 TLB
$ 00.11 TXB

$ 02.36 TLB

Thank You - - Call Again

	National Average	Years of Education 8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
Percent Correct:	72	54	68	77	76	77

Source: "The Adult Performance Level Study: A report submitted to the Office of Education Dissemination Review Panel." Undated but labelled in handwriting "O.K. 3/25/75."

FIGURE 57 APL - Test Items

ITEM 29: Examiner says, as respondent reads along:

"Isabelle Adams took a vocational interest test. She made high scores in the clerical and computation areas. Which job best fits her interests?

1 stenographer

* 2 payroll clerk

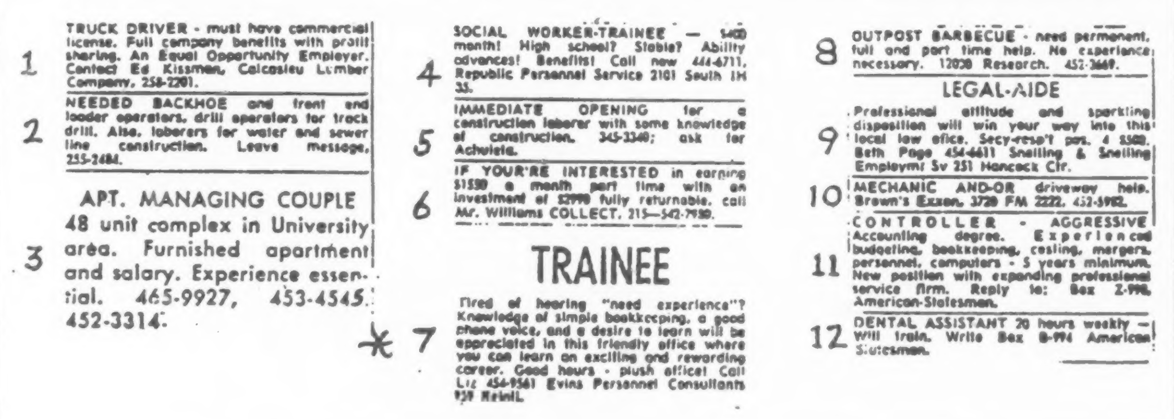
3 courtroom clerk

4 receptionist."

	National Average	Years of Education				
		8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
Percent Correct:	62	37	53	61	79	89

ITEM 30: Examiner says, as respondent reads along:

"Robert Murphy prefers an inside desk job. He is good in math. He has attended two years of high school where he took business courses. Which ad should he answer?"
(Correct response: #7)



1 TRUCK DRIVER - must have commercial license. Full company benefits with profit sharing. An Equal Opportunity Employer. Contact Ed Kissman, Calcasieu Lumber Company, 258-2201.

2 NEEDED BACKHOE and front end loader operators, drill operators for track drill. Also, laborers for water and sewer line construction. Leave message, 255-2484.

3 APT. MANAGING COUPLE 48 unit complex in University area. Furnished apartment and salary. Experience essential. 465-9927, 453-4545. 452-3314.

4 SOCIAL WORKER-TRAINEE — $400 month! High school? Stable? Ability advances! Benefits! Call now 444-6711, Republic Personnel Service 2101 South IH 35.

5 IMMEDIATE OPENING for a construction laborer with some knowledge of construction. 345-3340; ask for Achuleta.

6 IF YOUR'RE INTERESTED in earning $1530 a month part time with an investment of $2990 fully returnable, call Mr. Williams COLLECT. 215—542-7930.

* 7 TRAINEE

Tired of hearing "need experience"? Knowledge of simple bookkeeping, a good phone voice, and a desire to learn will be appreciated in this friendly office where you can learn an exciting and rewarding career. Good hours - plush office! Call Liz 454-9561 Evins Personnel Consultants 939 Reinli.

8 OUTPOST BARBECUE - need permanent, full and part time help. No experience necessary. 12030 Research. 452-3669.

9 LEGAL-AIDE

Professional attitude and sparkling disposition will win your way into this local law office. Secy-recep't pos. 4 $500. Beth Page 454-6611 Snelling & Snelling Employmt Sv 251 Hancock Ctr.

10 MECHANIC AND-OR driveway help. Brown's Exxon, 3720 FM 2222, 452-5902.

11 CONTROLLER - AGGRESSIVE Accounting degree. Experienced budgeting, bookkeeping, costing, mergers, personnel, computers - 5 years minimum. New position with expanding professional service firm. Reply to: Box Z-998, American-Statesman.

12 DENTAL ASSISTANT 20 hours weekly — Will train. Write Box B-994 American-Statesman.

	National Average	Years of Education				
		8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
Percent Correct.	62	33	54	64	77	88

Source: "The Adult Performance Level Study: A report submitted to the Office of Education Dissemination Review Panel." Undated but labelled in handwriting "O.K. 3/25/75."

FIGURE 58 APL - Test Items

ITEM 31: Examiner says, as respondent reads along:

"Dandy Employment Agency charges a fee of 4% of one's annual pay. The agency found a job for Mr. Jones at $8,000/year. If Mr. Jones wants to make $80 a month payments, how many months will it take him to pay the agency's fee?"

(Correct response: 4 months)

	National Average	Years of Education				
		8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
Percent Correct:	61	28	51	64	81	87

ITEM 32: Examiner says, as respondent reads along:

"If the government ordered a 15% reduction in home heating fuel, how much oil would a family get if they had been burning 200 gallons a month?"

(Correct response: 170 gallons)

	National Average	Years of Education				
		8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
Percent Correct:	63	42	52	65	74	84

ITEM 33: Examiner says, as respondent reads along:

"Here is a sign posted in a restaurant."

TODAY'S SPECIAL

Blue Plate Special	$1.25	Coffee	.25
Businessman's Delight	$1.00	Tea	.20
Drinks not included on specials		Milk	.15

Three men had lunch together. Two of the men had the Blue Plate Special and coffee, while the third man only had coffee. Including a 4% food tax, figure the total cost of the lunch for the three men.

(Correct response: $3.38)

	National Average	Years of Education				
		8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
Percent Correct:	58	40	51	61	65	68

Source: "The Adult Performance Level Study: A report submitted to the Office of Education Dissemination Review Panel." Undated but labelled in handwriting "O.K. 3/25/75."

FIGURE 59 APL - Test Items

ITEM 34: Examiner says, as respondent reads along:

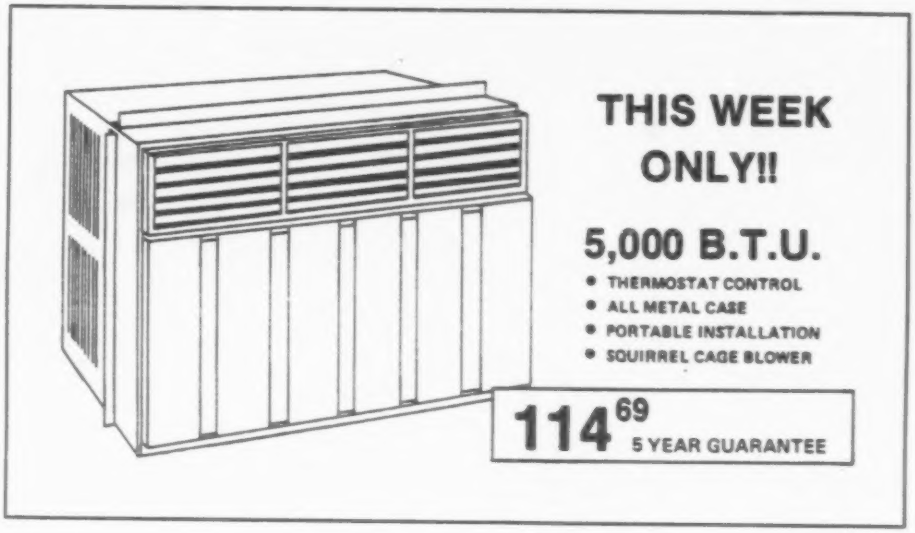
"G. W. Gibbs saw this ad in the paper Monday morning. His wife had been after him to buy an air conditioner, so Tuesday afternoon he left work early and went to the appliance store. When Mr. Gibbs inquired about the air conditioner, the salesman told him that the last one had been sold "only an hour ago," but they had a "much better" model on "special" for $159.59. What Mr. Gibbs should do is:

1 call a lawyer

* 2 report the store to the Better Business Bureau

3 consider the special as it may be better

4 leave the store because there's nothing he can do anyway."



THIS WEEK ONLY!!

5,000 B.T.U.

- THERMOSTAT CONTROL
- ALL METAL CASE
- PORTABLE INSTALLATION
- SQUIRREL CAGE BLOWER

114.69 5 YEAR GUARANTEE

		Years of Education				
	National Average	8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
Percent Correct:	58	46	54	57	66	74

Source: "The Adult Performance Level Study: A report submitted to the Office of Education Dissemination Review Panel." Undated but labelled in handwriting "O.K. 3/25/75."

FIGURE 60 APL - Test Items

ITEM 35: Examiner says, as respondent reads along:

"The law states that a sentence of life imprisonment is considered the same as a term of 20 years. If a person is eligible for parole after serving 1/3 of his term, how many months would a prisoner with life imprisonment have to serve before coming up for parole?"
(Correct response" 80 months; or 6 years and 8 months)

		Years of Education				
	National Average	8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
Percent Correct:	47	27	43	48	55	68

ITEM 36: Examiner says, as respondent reads along:

"The Sooper Suds Soap Company has contacted Benny Hill to become a part owner for only $1,500. In turn, Benny is to find people to invest in the company. Benny then receives 50% of the money invested by people he has influenced to join the company. This plan is known as:

* 1 a pyramid scheme

2 invest-a-friend

3 snowball effect

4 a bait and switch."

		Years of Education				
	National Average	8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
Percent Correct:	52	36	52	47	64	71

Source: "The Adult Performance Level Study: A report submitted to the Office of Education Dissemination Review Panel." Undated but labelled in handwriting "O.K. 3/25/75."

FIGURE 61 APL - Test Items

ITEM 37: Examiner says, as respondent reads along:

"One day, Mr. Morgan spent $32.50. Just out of curiosity, he wanted to know how much went for taxes. Here is a breakdown of what he spent:

- 4 gallons of gasoline at 45¢ a gallon, total cost $1.80, tax 9¢ a gallon
- 2 packs of cigarettes at 50¢ a pack, total cost $1.00, tax 26¢ a pack
- 1 lunch, total cost $2.20, tax 11¢
- groceries, total cost $25.00, tax 65¢
- medicine, total cost $2.50, no tax

How much did Mr. Morgan spend on taxes?"
(Correct response: $1.64)

Respondent
Reads
Along

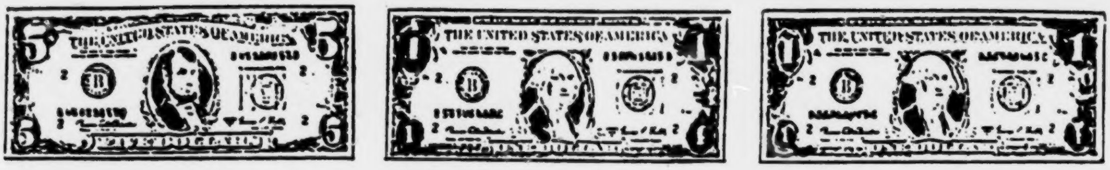
Item	Total Cost	Tax
4 gallons of gasoline at 45¢ a gallon	$ 1.80	9¢ a gallon
2 packs of cigarettes at 50¢ a pack	$ 1.00	26¢ a pack
1 lunch	$ 2.00	11¢ total
groceries	$ 25.00	65¢
medicine	$ 2.50	.00

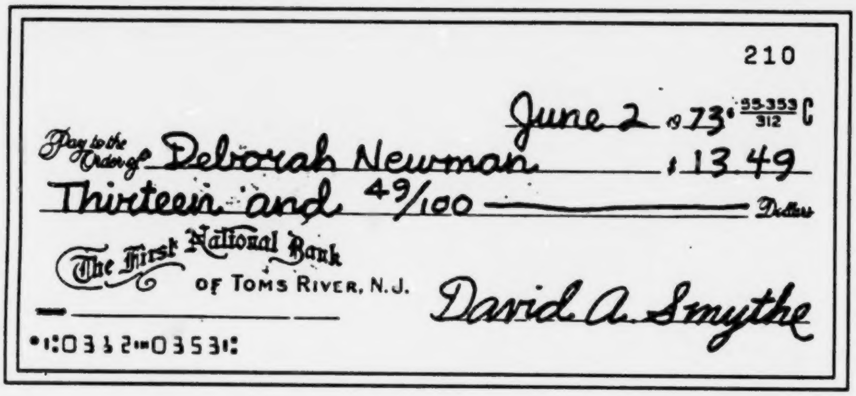
		Years of Education				
	National Average	8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
Percent Correct:	51	35	45	54	53	64

Source: "The Adult Performance Level Study: A report submitted to the Office of Education Dissemination Review Panel." Undated but labelled in handwriting "O.K. 3/25/75."

FIGURE 62 | **APL - Test Items**

ITEM 38: Examiner says, as respondent reads along:
"Deborah Newman is going to deposit this money and check in her checking account. Fill out the deposit slip for her."
(Correct response: $7 in cash + $13.49 in checks, sum of $20.49)


THE UNITED STATES OF AMERICA
5
1



210

June 2 1973 55-353/312 C

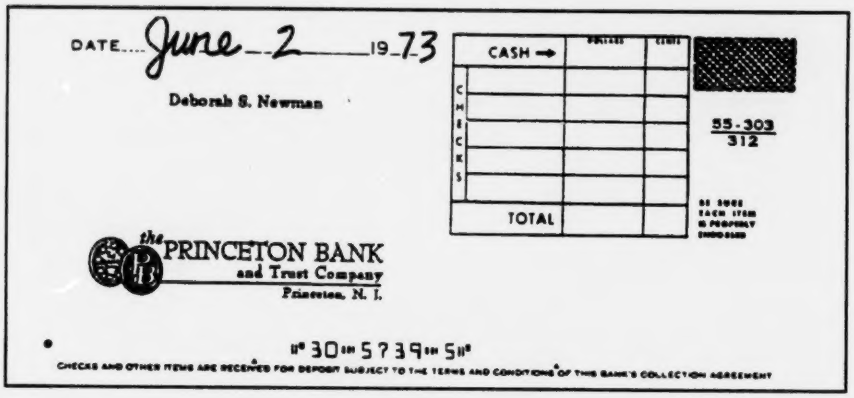
Pay to the Order of Deborah Newman $13.49

Thirteen and 49/100 Dollars

The First National Bank of Toms River, N.J.

David A. Smythe

⑆0312⑈0353⑆



DATE June 2 19 73

Deborah S. Newman

	DOLLARS	CENTS
CASH →		
CHECKS		
TOTAL		

55-303/312

BE SURE EACH ITEM IS PROPERLY ENDORSED

the PRINCETON BANK and Trust Company Princeton, N. J.

⑈30⑈5739⑈5⑈

CHECKS AND OTHER ITEMS ARE RECEIVED FOR DEPOSIT SUBJECT TO THE TERMS AND CONDITIONS OF THIS BANK'S COLLECTION AGREEMENT

	National Average	Years of Education: 8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
Percent Correct:	59	35	51	63	74	71

Source: "The Adult Performance Level Study: A report submitted to the Office of Education Dissemination Review Panel." Undated but labelled in handwriting "O.K. 3/25/75."

Figure 63

APL - Test Items

ITEM 39: Examiner says, as respondent reads along:

"Floyd was picked up by the police on suspicion of robbing the Ace Liquor Mart. They told him that if he signed a confession, he would get off with only one year probation. Floyd signed a confession and got 5-15 years in jail from the judge.

Read this part of a pamphlet on your rights when you are arrested. Mark the sentence that tells why Floyd should not have followed the advice he was given."

YOUR RIGHTS AFTER ARREST

What Happens After You Are Arrested?

May You Be Forced To Answer Questions?

After arrest, you have an absolute right to remain silent and not to answer any questions.

No one has a right to force you to answer questions or to sign anything. If someone does try to make you talk or sign something by threats or promises, tell the police official in charge and your lawyer. No promise made in the police station will be binding in court. } Correct Response:

May You Use The Telephone?

You have a right to use the telephone as soon as you are brought to the station to call your family, or a friend, or a lawyer, and to arrange bail.

		Years of Education				
	National Average	8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
Percent Correct:	42	18	31	47	52	59

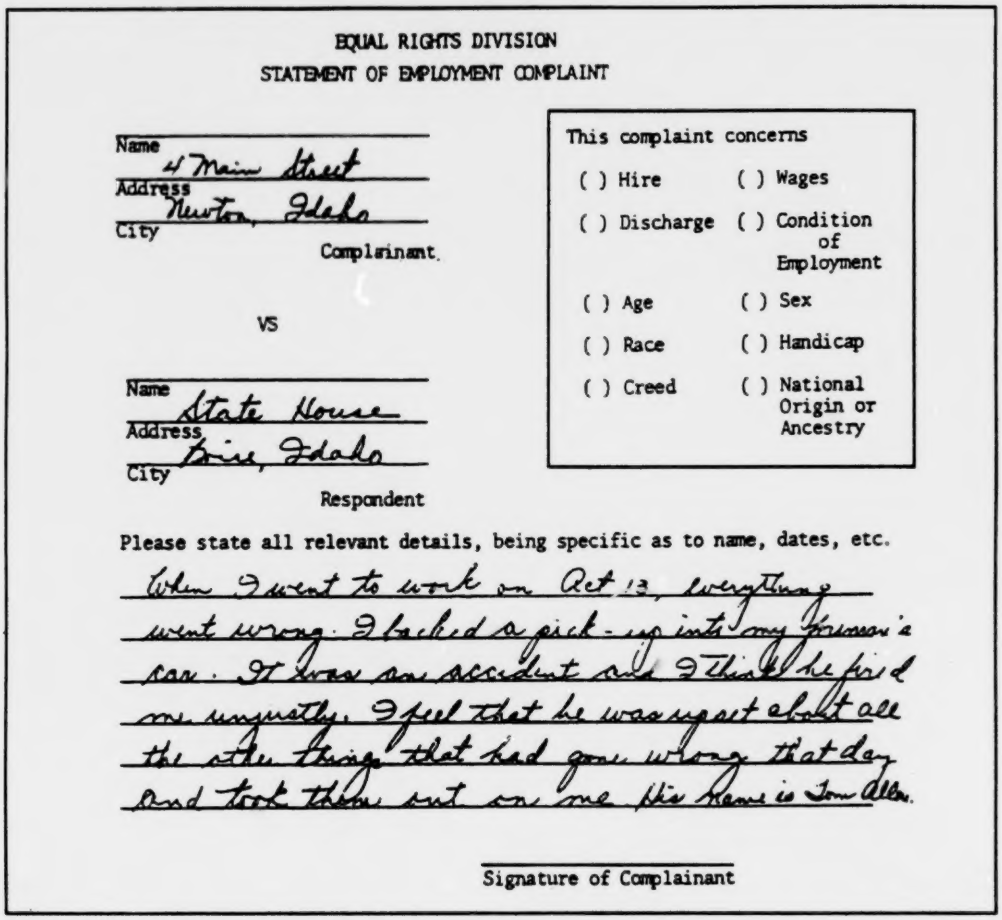
Source: "The Adult Performance Level Study: A report submitted to the Office of Education Dissemination Review Panel." Undated but labelled in handwriting "O.K. 3/25/75."

FIGURE 64 APL - Test Items

ITEM 40: Examiner says, as respondent reads along:

"Joe LeBlanc worked for the State Highway Department. On October 13, everything at work seemed to go wrong -- cables snapped, a crane got stuck, and Joe backed a pick-up into the foreman's car. The foreman, Tom Allen, got angry and fired Joe and the guy who got the crane stuck. Joe felt that he had been fired without just cause and filed a complaint.

Fill out the missing parts of the complaint for Joe."



EQUAL RIGHTS DIVISION
STATEMENT OF EMPLOYMENT COMPLAINT

Name
4 Main Street
Address
Newton, Idaho
City
Complainant

VS

Name
State House
Address
Boise, Idaho
City
Respondent

This complaint concerns

( ) Hire
( ) Discharge
( ) Age
( ) Race
( ) Creed

( ) Wages
( ) Condition of Employment
( ) Sex
( ) Handicap
( ) National Origin or Ancestry

Please state all relevant details, being specific as to name, dates, etc.

When I went to work on Oct 13, everything went wrong. I backed a pick-up into my foreman's car. It was an accident and I think he fired me unjustly. I feel that he was upset about all the other things that had gone wrong that day and took them out on me. His name is Tom Allen.

Signature of Complainant

(Correct response: Part 1 - Complainant; Part 2 - Respondent; Part 3 - Complaint concerns discharge; Part 4 -Signature)

		Years of Education				
Percent Correct:	National Average	8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
Part 1	85	60	83	90	93	92
Part 2	38	20	26	41	50	54
Part 3	79	53	69	85	90	90
Part 4	76	50	72	80	85	91

Source: "The Adult Performance Level Study: A report submitted to the Office of Education Dissemination Review Panel." Undated but labelled in handwriting "O.K. 3/25/75."

ITEM 41: Examiner says, as respondent reads along:

"You're going to help Robert Dorney fill out his income tax form. Look at the 1040 Income Tax form closely.

Fill in the parts where there is a blank.
Below is a tax table that you will need for item number 18."

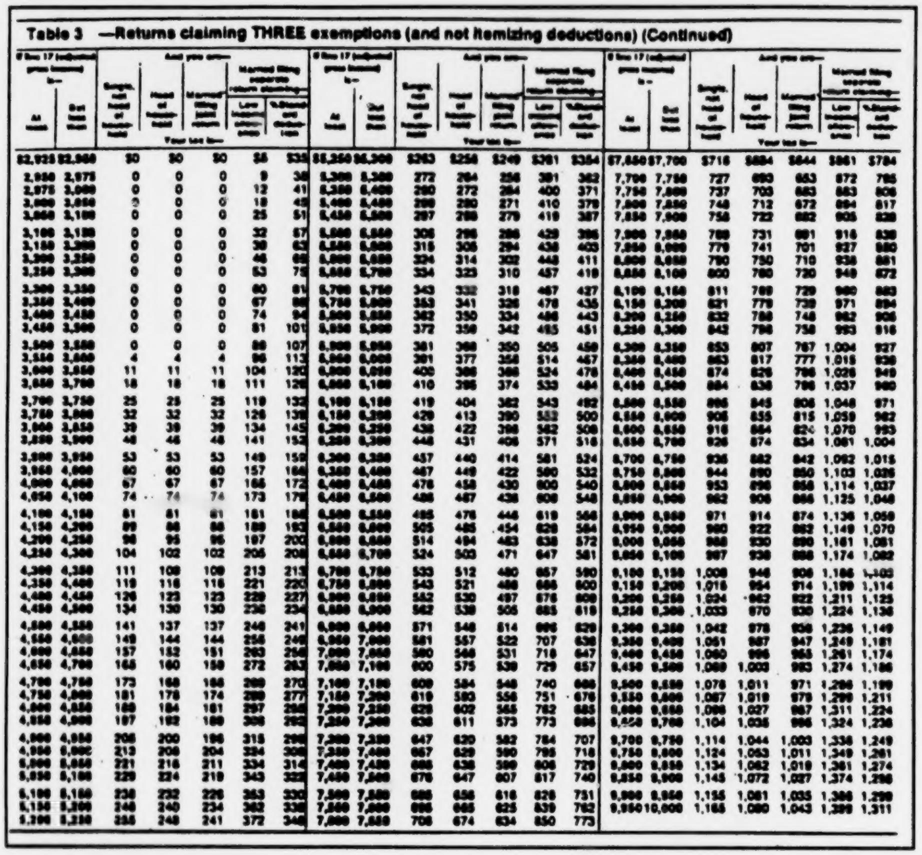


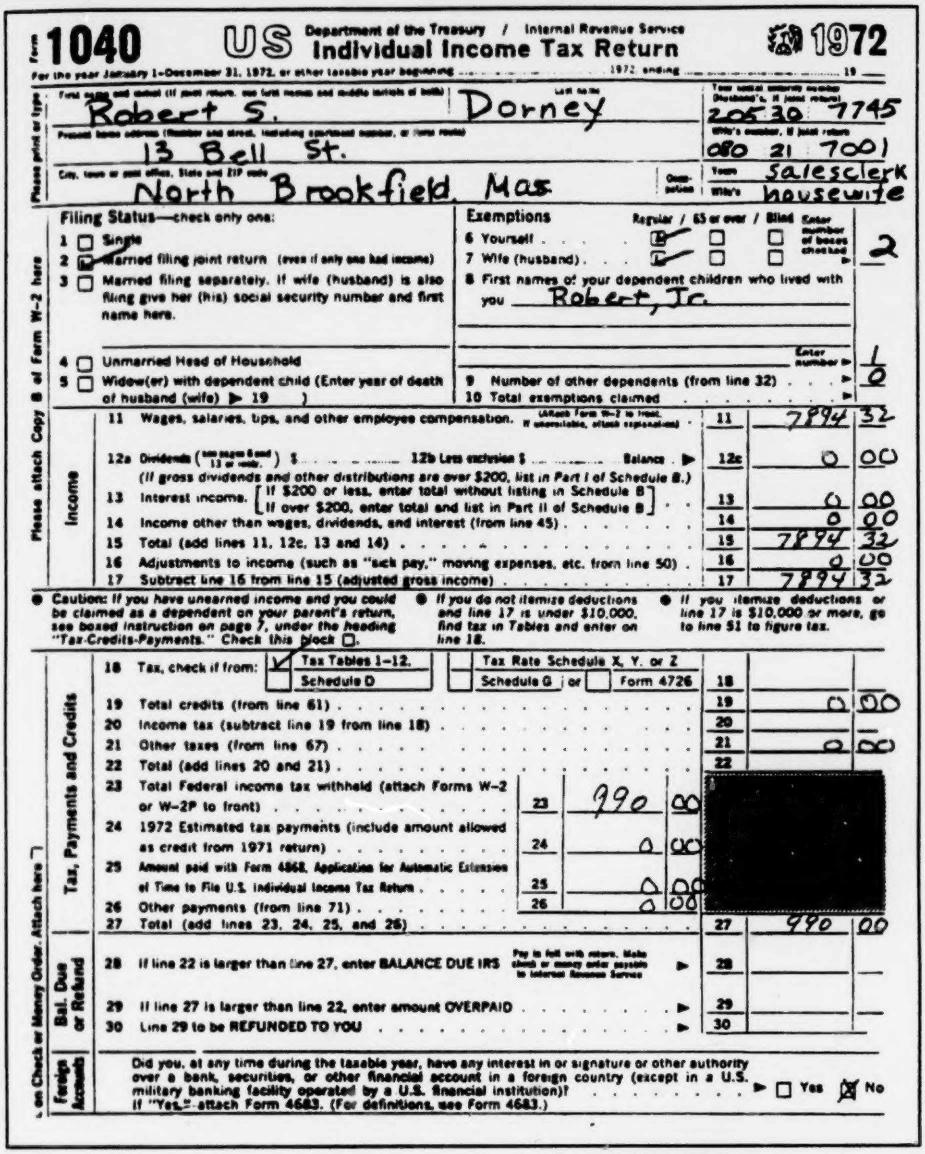
Table 3 —Returns claiming THREE exemptions (and not itemizing deductions) (Continued)

Correct responses:

Part 1	Line 10	3	Part 5	Line 28	$000.00
Part 2	Line 18	$682.00	Part 6	Line 29	$308.00
Part 3	Line 20	$682.00	Part 7	Line 30	$308.00
Part 4	Line 22	$682.00			

Source: "The Adult Performance Level Study: A report submitted to the Office of Education Dissemination Review Panel." Undated but labelled in handwriting "O.K. 3/25/75."

FIGURE 66 APL - Test Items



Form 1040 US Department of the Treasury / Internal Revenue Service
Individual Income Tax Return 1972
For the year January 1–December 31, 1972, or other taxable year beginning .... 1972, ending .... 19 ___

Robert S. Dorney
Your social security number (Husband's, if joint return) 205 30 7745
13 Bell St.
Wife's number, if joint return 080 21 7001
City, town or post office, State and ZIP code North Brookfield, Mas
Occupation Yours Salesclerk
Wife's housewife

Please print or type

Filing Status—check only one:
1 ☐ Single
2 ☑ Married filing joint return (even if only one had income)
3 ☐ Married filing separately. If wife (husband) is also filing give her (his) social security number and first name here.
4 ☐ Unmarried Head of Household
5 ☐ Widow(er) with dependent child (Enter year of death of husband (wife) ▶ 19)

Exemptions Regular / 65 or over / Blind
6 Yourself ☑ ☐ ☐
7 Wife (husband) ☑ ☐ ☐ Enter number of boxes checked ▶ 2
8 First names of your dependent children who lived with you Robert, Jr. Enter number ▶ 1
9 Number of other dependents (from line 32) ▶ 0
10 Total exemptions claimed ▶

Please attach Copy B of Form W-2 here

Income
11 Wages, salaries, tips, and other employee compensation. (Attach Form W-2 to front. If unavailable, attach explanation) 11 7894 32
12a Dividends (see pages 6 and 13 of instr.) $ .... 12b Less exclusion $ .... Balance ▶ 12c 0 00
(If gross dividends and other distributions are over $200, list in Part I of Schedule B.)
13 Interest income. [If $200 or less, enter total without listing in Schedule B / If over $200, enter total and list in Part II of Schedule B] 13 0 00
14 Income other than wages, dividends, and interest (from line 45) 14 0 00
15 Total (add lines 11, 12c, 13 and 14) 15 7894 32
16 Adjustments to income (such as "sick pay," moving expenses, etc. from line 50) 16 0 00
17 Subtract line 16 from line 15 (adjusted gross income) 17 7894 32

● Caution: If you have unearned income and you could be claimed as a dependent on your parent's return, see boxed instruction on page 7, under the heading "Tax-Credits-Payments." Check this block ☐.
● If you do not itemize deductions and line 17 is under $10,000, find tax in Tables and enter on line 18.
● If you itemize deductions or line 17 is $10,000 or more, go to line 51 to figure tax.

Tax, Payments and Credits
18 Tax, check if from: ☑ Tax Tables 1–12, ☐ Schedule D ☐ Tax Rate Schedule X, Y, or Z ☐ Schedule G or ☐ Form 4726 18
19 Total credits (from line 61) 19 0 00
20 Income tax (subtract line 19 from line 18) 20 —
21 Other taxes (from line 67) 21 0 00
22 Total (add lines 20 and 21) 22
23 Total Federal income tax withheld (attach Forms W-2 or W-2P to front) 23 990 00
24 1972 Estimated tax payments (include amount allowed as credit from 1971 return) 24 0 00
25 Amount paid with Form 4868, Application for Automatic Extension of Time to File U.S. Individual Income Tax Return 25 0 00
26 Other payments (from line 71) 26 0 00
27 Total (add lines 23, 24, 25, and 26) 27 990 00

Bal. Due or Refund
28 If line 22 is larger than line 27, enter BALANCE DUE IRS (Pay in full with return. Make check or money order payable to Internal Revenue Service) ▶ 28 —
29 If line 27 is larger than line 22, enter amount OVERPAID ▶ 29 —
30 Line 29 to be REFUNDED TO YOU ▶ 30

Foreign Accounts
Did you, at any time during the taxable year, have any interest in or signature or other authority over a bank, securities, or other financial account in a foreign country (except in a U.S. military banking facility operated by a U.S. financial institution)? If "Yes," attach Form 4683. (For definitions, see Form 4683.) ▶ ☐ Yes ☒ No

on Check or Money Order. Attach here

Percent Correct:	National Average	Years of Education: 8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
Part 1	30	8	25	33	37	45
Part 2	39	7	30	44	47	65
Part 3	27	4	18	30	36	46
Part 4	31	5	23	35	41	54
Part 5	45	17	30	50	61	67
Part 6	28	6	21	31	35	48
Part 7	30	8	21	33	38	52

Source: "The Adult Performance Level Study: A report submitted to the Office of Education Dissemination Review Panel." Undated but labelled in handwriting "O.K. 3/25/75."

FIGURE 67 | APL - Test Items

ITEM 42: Examiner says, as respondent reads along:

"Two Ton Tony" stopped in at the Palace Bar and Grill after work. He drank six 8-ounce glasses of beer and three 1 1/2 - ounce shots of 100 proof whiskey. He also ate a box of pretzels (50 sticks). How many calories did Tony take in at the Palace?"

(Correct response: 1,175)

			Number of Calories
Pancakes (griddle cakes):			
Wheat (home recipe)	1	cake, 4 in. in diameter	60
Buckwheat (with buckwheat pancake mix)	1	cake, 4 in. in diameter	55
Pizza (cheese)	5	1/2 inch sector, 1/3 of a 14 - inch pie	185
Pretzels	5	small sticks	20
Rye wafers	2	wafers, 1 7/8 by 3 1/2	45
Carbonated beverages:			
Ginger ale		8 - ounce glass	70
Cola-type		8 - ounce glass	95
Alcoholic beverages:			
Beer, 3.6 percent alcohol by weight		8 - ounce glass	100
Whisky, gin, rum:			
100 - proof	1	jigger (1 1/2 ounces)	125
90 - proof	1	jigger (1 1/2 ounces)	110
86 - proof	1	jigger (1 1/2 ounces)	105

		Years of Education				
	National Average	8 years or less	less than 12 years	High School Graduate	Some College	College Graduate
Percent Correct:	56	25	44	59	72	79

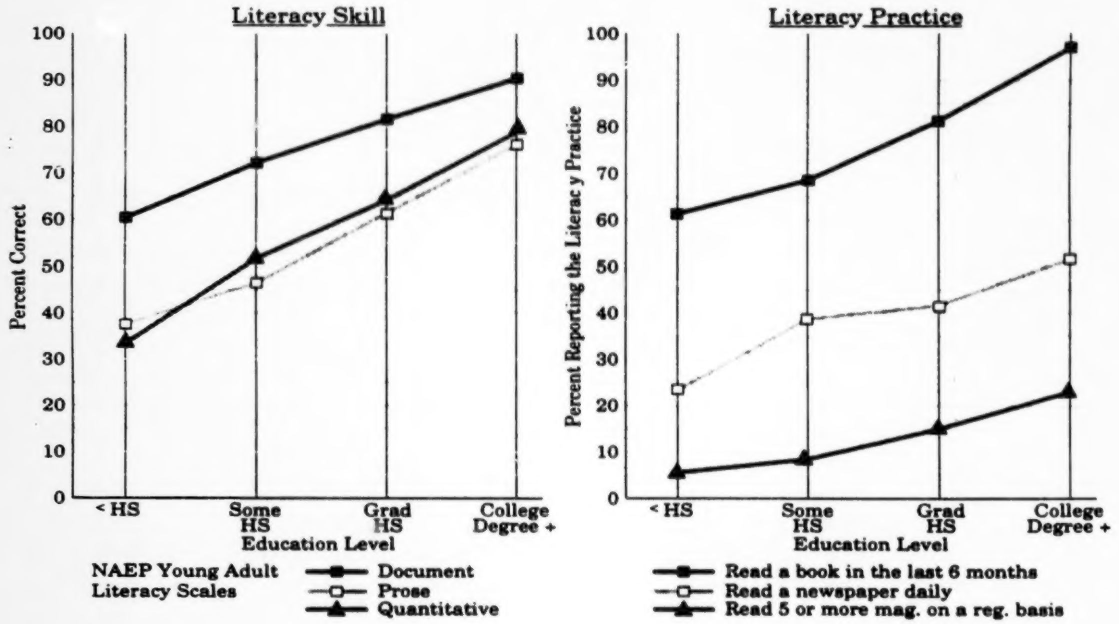
Source: "The Adult Performance Level Study: A report submitted to the Office of Education Dissemination Review Panel." Undated but labelled in handwriting "O.K. 3/25/75."

National Assessment of Educational Progress Literacy: Profiles of America's Young Adults-1986

In 1985 the National Assessment of Educational Progress studied the literacy skills of young adults (21-25 years old) living in households in the 48 contiguous United States. Like all previous surveys of adult literacy, the 1985 survey gave data on the percent of young adults who performed various literacy tasks correctly. However, the report primarily reported literacy scores using scale scores for three different domains of literacy tasks: prose, document, and quantitative literacy tasks. The scale scores for each of three different types of literacy task domains ranged from 0 to 500, with the majority of tasks (items) falling between 200 and 400. Pages 100 through 112 present samples of items from the young adult literacy survey (YALS). More explanations about the scale scores will be found on those pages.

To show how performance on the YALS compares with earlier adult literacy assessments, the figure below shows skill levels on the prose, document, and quantitative scales in terms of average percent correct scores for people at different levels of education. The figure also shows on the right side the relationships among education level and the engagement in various literacy practices (reading books, magazines, and newpapers). Both the skill and practices data resemble the findings of Buswell in 1937 (p. 43) and the Adult Functional Reading Study of 1973 (p. 63). People with more education read more and they have higher reading skills.

FIGURE 68 | **Young Adults Literacy Study: YALS - 1986**

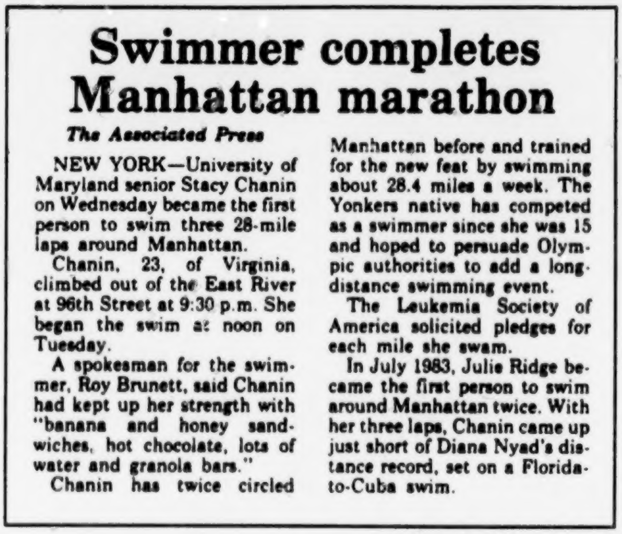


Source: I. Kirsch and A Jungeblut. (1986) Literacy: Profiles of America's Young Adults. Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress. (Table 4.1, p. IV - 4)

Source: I. Kirsch and A Jungeblut. (1986) Literacy: Profiles of America's Young Adults. Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress. (Table 6, 14, 6.15, 6.16, p. IV - 20 - VI - 22.))

Figure 69 | **Prose Literacy ***

Locate and underline the statement that indicates what the swimmer ate to keep up her strength during the swim.



Swimmer completes Manhattan marathon

The Associated Press

NEW YORK—University of Maryland senior Stacy Chanin on Wednesday became the first person to swim three 28-mile laps around Manhattan.

Chanin, 23, of Virginia, climbed out of the East River at 96th Street at 9:30 p.m. She began the swim at noon on Tuesday.

A spokesman for the swimmer, Roy Brunett, said Chanin had kept up her strength with "banana and honey sandwiches, hot chocolate, lots of water and granola bars."

Chanin has twice circled Manhattan before and trained for the new feat by swimming about 28.4 miles a week. The Yonkers native has competed as a swimmer since she was 15 and hoped to persuade Olympic authorities to add a long-distance swimming event.

The Leukemia Society of America solicited pledges for each mile she swam.

In July 1983, Julie Ridge became the first person to swim around Manhattan twice. With her three laps, Chanin came up just short of Diana Nyad's distance record, set on a Florida-to-Cuba swim.

(Reduced from original copy)

Task Difficulty: 210

Skill Level of Respondents	210	150	200	250	300	350	400	450
Probability That Respondents at Each Skill Level Can Perform the Task Correctly	80	32	74	94	99	100	100	100

Source: I. Kirsch and A. Jungeblut. (1986a). Literacy: Profiles of America's Young Adults. Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress. (p. 11)

* This item was also used in the 1992 National Adult Literacy Survey (NALS).

In the young adult literacy survey (YALS), both people and tasks (items) were given scale scores. For instance, a person with a skill level of 210 would have a probability of .80 of performing a task that has a difficulty level of 210 (see item above). All of the sample tasks presented on pages 100 through 112 show the task difficulty of the item and the probability that people with different skill levels could perform the item. In the item above, the task difficulty is 210, and people with a 210 skill level have an 80% probability of being able to perform the task. However, other people with lower skill levels may also be able to perform the task, though with lower probabilities. In the item above, people with skill levels of 150 have a 32% probability of being able to perform the task that is at the 210 difficulty level. People at the 200 level have a 74% probability of performing the task. People at the 300 skill level have a 99% probability of performing the 210 difficulty level task.

FIGURE 70 Prose Literacy *

A manufacturing company provides its customers with the following instructions for returning appliances for service:

> When returning appliance for servicing, include a note telling as clearly and as specifically as possible what is wrong with the appliance.

A repair person for the company receives four appliances with the following notes attached. Circle the letter next to the note which best follows the instructions supplied by the company.

A The clock does not run correctly on this clock radio. I tried fixing it, but I couldn't.

C The alarm on my clock radio doesn't go off at the time I set. It rings 15-30 minutes later.

B My clock radio is not working. It stopped working right after I used it for five days.

D This radio is broken. Please repair and return by United Parcel Service to the address on my slip.

(Reduced from original copy)

Task Difficulty: 279

Skill Level of Respondents	279	150	200	250	300	350	400	450
Probability That Respondents at Each Skill Level Can Perform the Task Correctly	80	27	35	62	89	98	100	100

Source: I. Kirsch and A. Jungeblut. (1986a). Literacy: Profiles of America's Young Adults. Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress. (p. 12)

* This item was also used in the 1992 National Adult Literacy Survey (NALS).

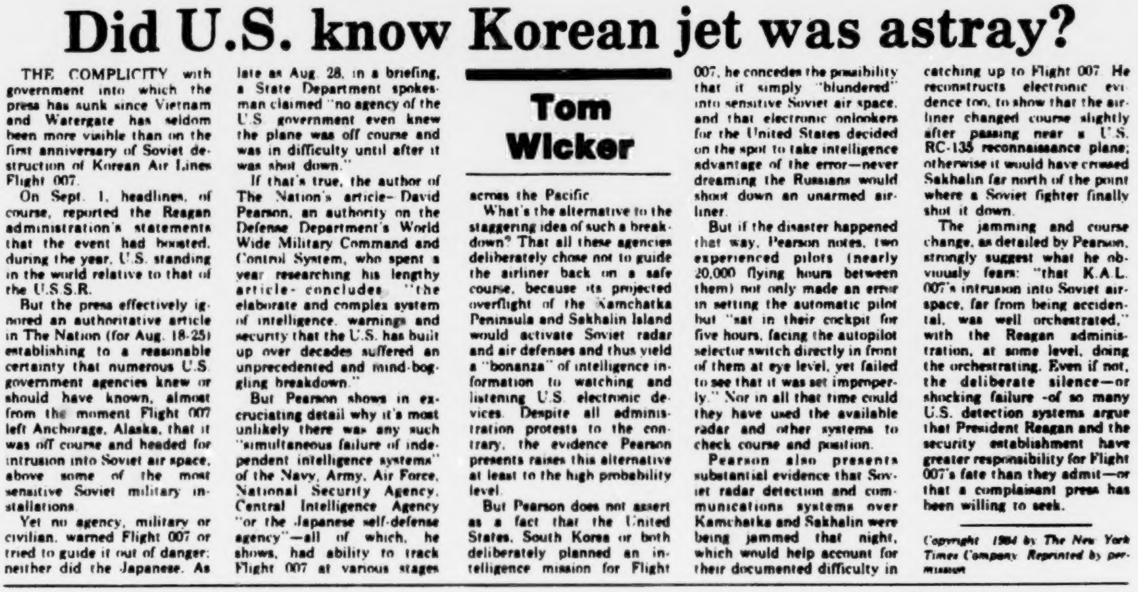
This test item has a task difficulty of 279, meaning that people with a skill level of 279 have an 80% probability of being able to perform the task. People at a skill level of 150 have only a 27% probability of being able to perform this task, while people at a skill level of 300 have an 89% probability of performing the item and those at a skill level of 350 have a 98% probability of performing the task.

On the Prose scale, the YALS report states that, over all items,

99.7	percent perform at the 150 level or above,
96.1	percent perform at the 200 level or above,
82.7	percent perform at the 250 level or above,
56.4	percent perform at the 300 level or above,
21.1	percent perform at the 350 level or above,
8.8	percent perform at the 375 level or above.

FIGURE 71 Prose Literacy *

Synthesize the main argument from the following newspaper column.



Did U.S. know Korean jet was astray?

Tom Wicker

THE COMPLICITY with government into which the press has sunk since Vietnam and Watergate has seldom been more visible than on the first anniversary of Soviet destruction of Korean Air Lines Flight 007.

On Sept. 1, headlines, of course, reported the Reagan administration's statements that the event had boosted, during the year, U.S. standing in the world relative to that of the U.S.S.R.

But the press effectively ignored an authoritative article in The Nation (for Aug. 18-25) establishing to a reasonable certainty that numerous U.S. government agencies knew or should have known, almost from the moment Flight 007 left Anchorage, Alaska, that it was off course and headed for intrusion into Soviet air space, above some of the most sensitive Soviet military installations.

Yet no agency, military or civilian, warned Flight 007 or tried to guide it out of danger; neither did the Japanese. As late as Aug. 28, in a briefing, a State Department spokesman claimed "no agency of the U.S. government even knew the plane was off course and was in difficulty until after it was shot down."

If that's true, the author of The Nation's article– David Pearson, an authority on the Defense Department's World Wide Military Command and Control System, who spent a year researching his lengthy article– concludes "the elaborate and complex system of intelligence, warnings and security that the U.S. has built up over decades suffered an unprecedented and mind-boggling breakdown."

But Pearson shows in excruciating detail why it's most unlikely there was any such "simultaneous failure of independent intelligence systems" of the Navy, Army, Air Force, National Security Agency, Central Intelligence Agency "or the Japanese self-defense agency"—all of which, he shows, had ability to track Flight 007 at various stages across the Pacific.

What's the alternative to the staggering idea of such a breakdown? That all these agencies deliberately chose not to guide the airliner back on a safe course, because its projected overflight of the Kamchatka Peninsula and Sakhalin Island would activate Soviet radar and air defenses and thus yield a "bonanza" of intelligence information to watching and listening U.S. electronic devices. Despite all administration protests to the contrary, the evidence Pearson presents raises this alternative at least to the high probability level.

But Pearson does not assert as a fact that the United States, South Korea or both deliberately planned an intelligence mission for Flight 007; he concedes the possibility that it simply "blundered" into sensitive Soviet air space, and that electronic onlookers for the United States decided on the spot to take intelligence advantage of the error—never dreaming the Russians would shoot down an unarmed airliner.

But if the disaster happened that way, Pearson notes, two experienced pilots (nearly 20,000 flying hours between them) not only made an error in setting the automatic pilot but "sat in their cockpit for five hours, facing the autopilot selector switch directly in front of them at eye level, yet failed to see that it was set improperly." Nor in all that time could they have used the available radar and other systems to check course and position.

Pearson also presents substantial evidence that Soviet radar detection and communications systems over Kamchatka and Sakhalin were being jammed that night, which would help account for their documented difficulty in catching up to Flight 007. He reconstructs electronic evidence too, to show that the airliner changed course slightly after passing near a U.S. RC-135 reconnaissance plane; otherwise it would have crossed Sakhalin far north of the point where a Soviet fighter finally shot it down.

The jamming and course change, as detailed by Pearson, strongly suggest what he obviously fears: "that K.A.L. 007's intrusion into Soviet airspace, far from being accidental, was well orchestrated," with the Reagan administration, at some level, doing the orchestrating. Even if not, the deliberate silence—or shocking failure -of so many U.S. detection systems argue that President Reagan and the security establishment have greater responsibility for Flight 007's fate than they admit—or that a complaisant press has been willing to seek.

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(Reduced from original copy)

Task Difficulty: 340

Skill Level of Respondents	340	150	200	250	300	350	400	450
Probability That Respondents at Each Skill Level Can Perform the Task Correctly	80	02	07	24	56	84	95	98

Source: I. Kirsch and A. Jungeblut. (1986a). Literacy: Profiles of America's Young Adults. Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress. (p. 13)

* This item was also used in the 1992 National Adult Literacy Survey (NALS).

This item has a difficulty level of 340, meaning that people must possess a skill level of 340 to have an 80% probability of performing this task. Note, though, that people with a skill level of 300 have a 56% probability of performing the task, and those with a skill level of 250 have a 24% probability of being able to perform the task. This illustrates that even though people may not be at the level of skill demanded for having an 80% probability of performing the task, they may nonetheless be able to perform it, albeit with a lower probability of success.

The YALS technical report states that, "Successful performance was determined to be that point on the item characteristic curve (ICC) at which an individual has an 80% probability of correct response to a given task or 80% of the people respond to the task correctly. Therefore, population estimates at specified points along each scale represent an 80% probability criterion. Use of this criterion does not imply that individuals scoring below a given level will be unable to respond correctly to any task above his/her estimated level of proficiency" (see Figure 68, p. 99 for sources of this quote: Kirsch & Jungeblut, 1986, p. IV-12).

FIGURE 72 **Prose Literacy ***

12. What is the poet trying to express in this poem? ____________

The pedigree of honey
Does not concern the Bee —
A clover, any time, to him
Is Aristocracy — (Emily Dickinson)

Reprinted by permission of the publishers and the Trustees of Amherst College from *The Poems of Emily Dickinson*, edited by Thomas H. Johnson, Cambridge, Mass.: The Belknap Press of Harvard University Press, Copyright 1951, © 1955, 1979, 1983 by the President and fellows of Harvard College.

(Reduced from original copy)

Task Difficulty: 387

Skill Level of Respondents	387	150	200	250	300	350	400	450
Probability That Respondents at Each Skill Level Can Perform the Task Correctly	80	01	04	11	31	61	85	95

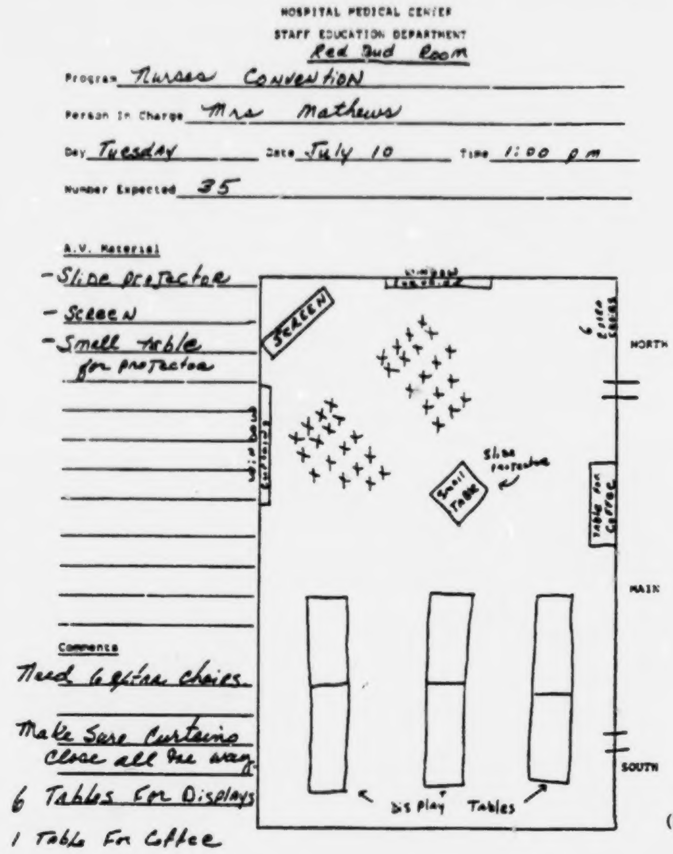
Source: I. Kirsch and A. Jungeblut. (1986a). Literacy: Profiles of America's Young Adults. Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress. (p. 14)

* This item was also used in the 1992 National Adult Literacy Survey (NALS).

This item has a difficulty level of 387, meaning that people must possess a skill level of 387 to have an 80% probability of performing this task correctly. It is interesting to speculate about why interpreting this poem, with only seventeen words, is more difficult than the preceeding task about Tom Wicker's New York Times article. The latter has several hundred words and numerous sentences. Yet it was easier for more people to synthesize the main argument from Wicker's article than to say what the poet was trying to express in the brief poem above. According to the YALS, only 8.8 percent of the young adult population possessed Prose skill levels of 375 or above. So fewer than one in ten young adults would be expected to perform the poetry interpretation task correctly. However, note that people with a skill level of 350 have a 61% probability of performing the task, and those at a skill level of 300 have a probabilty of 31% of being able to perform the task correctly. Thus, even though only fewer than ten percent of the young adults are at the 375 level or above, more than that could be expected to perform the task if the standard for performing correctly was set lower than an 80% probability. For instance, if the standard for being defined as possessing skills at a given level were set at 60%, then the poetry item would be said to have a difficulty level of 350, and all those presently scoring at the 350 level or above (21 percent of the young adults) would be designated as possessing the skills for performing this task. This illustrates that in the YALS study, whether one is below, at, or above a given skill level depends upon the standard for performance that is established by the test developers. In the absence of any compelling basis for establishing a standard, any standard that is set is arbitrary. It represents a judgment about how good is good enough to be called proficient at a given skill level.

FIGURE 73 Document Literacy *

Using the meeting room form below, enter the "time" of the meeting in a space provided.



HOSPITAL MEDICAL CENTER
STAFF EDUCATION DEPARTMENT
Red Bud Room

Program Nurses Convention
Person In Charge Mrs mathews
Day Tuesday Date July 10 Time 1:00 pm
Number Expected 35

A.V. Material
- Slide projector
- Screen
- Small table for projector

Comments
Need 6 extra chairs
Make Sure Curtains close all the way.
6 Tables For Displays
1 Table For Coffee

SCREEN
6 Extra Chairs
NORTH
Slide projector
Small Table
Table for Coffee
MAIN
SOUTH
Display Tables

(Reduced from original copy)

Task Difficulty: 169

Skill Level of Respondents	169	150	200	250	300	350	400	450
Probability That Respondents at Each Skill Level Can Perform the Task Correctly	80	65	93	99	100	100	100	100

Source: I. Kirsch and A. Jungeblut. (1986a). Literacy: Profiles of America's Young Adults. Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress. (p. 20)

* This item was also used in the 1992 National Adult Literacy Survey (NALS).

This Document literacy task is at the easy end of the scale, with a difficulty level of 169, meaning that people must possess a skill level of 169 to have an 80% probability of being able to perform the task correctly.

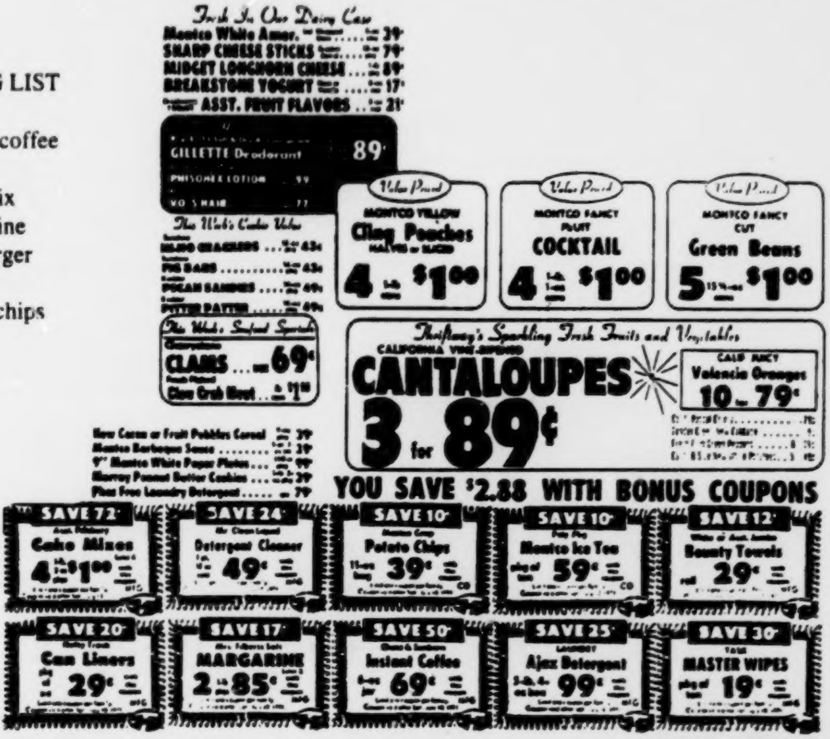
On the Document scale, the YALS report states that, over all items,

99.7	percent perform at the 150 level or above,
95.5	percent perform at the 200 level or above,
83.8	percent perform at the 250 level or above,
57.2	percent perform at the 300 level or above,
20.2	percent perform at the 350 level or above,
8.8	percent perform at the 375 level or above.

FIGURE 74	**Document Literacy ***

Match items in the shopping list to the money-saving coupons.

SHOPPING LIST
- milk
- instant coffee
- bread
- cake mix
- margarine
- hamburger
- eggs
- potato chips



Fresh In Our Dairy Case

SHARP CHEESE STICKS ... 79¢

MIDGET LONGHORN CHEESE ... 89¢

BREAKSTONE YOGURT ... 17¢

ASST. FRUIT FLAVORS ... 21¢

GILLETTE Deodorant 89¢

Value Priced

MONTCO YELLOW Cling Peaches 4 $1.00

MONTCO FANCY FRUIT COCKTAIL 4 $1.00

MONTCO FANCY CUT Green Beans 5 $1.00

CLAMS ... 69¢

CANTALOUPES 3 for 89¢

Valencia Oranges 10 79¢

YOU SAVE $2.88 WITH BONUS COUPONS

SAVE 72¢ Cake Mixes 4 $1.00

SAVE 24¢ Detergent Cleaner 49¢

SAVE 10¢ Potato Chips 39¢

SAVE 10¢ Montco Ice Tea 59¢

SAVE 12¢ Bounty Towels 29¢

SAVE 20¢ Can Liners 29¢

SAVE 17¢ MARGARINE 2 85¢

SAVE 50¢ Instant Coffee 69¢

SAVE 25¢ Ajax Detergent 99¢

SAVE 30¢ MASTER WIPES 19¢

(Layout was revised slightly from the assessment to accommodate this report)

Task Difficulty: 211

Skill Level of Respondents	211	150	200	250	300	350	400	450
Probability That Respondents at Each Skill Level Can Perform the Task Correctly	80	60	77	88	94	97	99	99

Source: I. Kirsch and A. Jungeblut. (1986a). Literacy: Profiles of America's Young Adults. Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress. (pp. 21-22)

* This item was also used in the 1992 National Adult Literacy Survey (NALS).

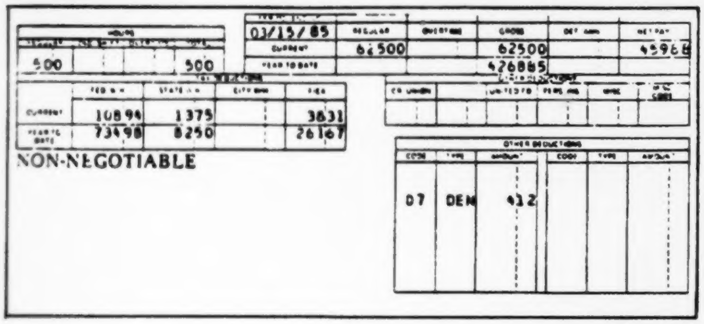
This Document literacy item has a task difficulty of 211. Therefore, people must possess a skill level of 211 to have an 80% probability of being able to perform this task. The data for this task indicates that people with a skill level of 150 have a 60% probability of being able to perform the task, while those with a skill level of 300 have a 94% probability of being able to perform the task. It is instructive to compare this task to Guy Buswell's Price List test (page44) of 1937.

This comparison shows that the concept of the types of literacy tasks that adults are expected to perform has not changed completely in the last half century.

BEST COPY AVAILABLE

FIGURE 75	**Document Literacy ***

Write the "gross" pay for this year-to-date:____________.



03/15/85

500 500

62500 62500 45968

426885

10899 1375 3831

73498 8250 26167

NON-NEGOTIABLE

07 DEN 412

(Reduced from original copy)

Task Difficulty: 257

Skill Level of Respondents	257	150	200	250	300	350	400	450
Probability That Respondents at Each Skill Level Can Perform the Task Correctly	80	11	38	76	94	99	100	100

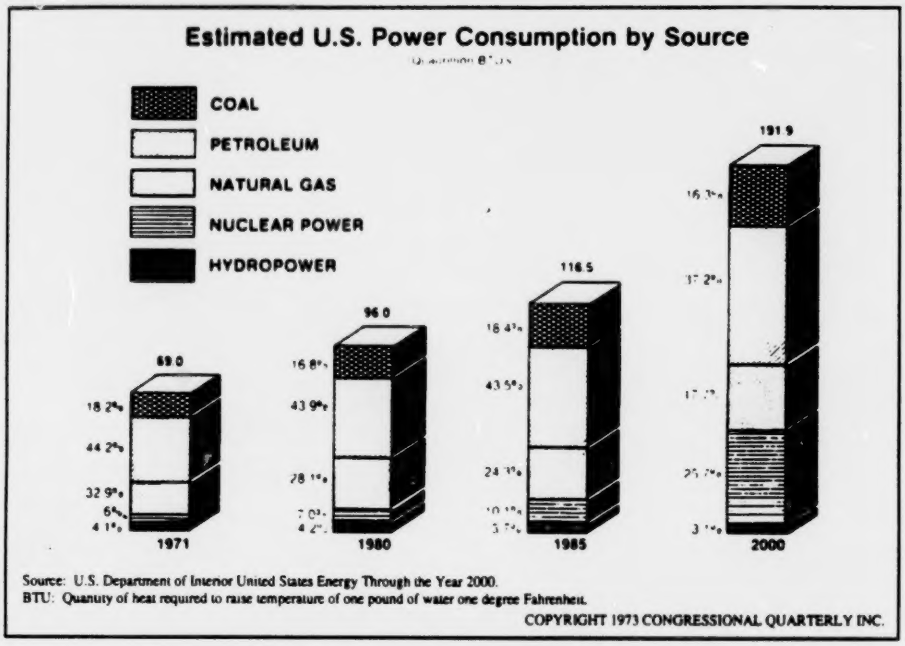
Source: I. Kirsch and A. Jungeblut. (1986a). Literacy: Profiles of America's Young Adults. Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress. (p. 23)

* This item was also used in the 1992 National Adult Literacy Survey (NALS).

In the Document literacy assessment, 73 percent of the tasks demanded 300 level skills or lower, while 57.2 percent of young adults possessed 300 level skills or higher. Thus, the Document tasks tended to be skewed toward the easy end of literacy task difficulties. Overall, the average percent correct for Document literacy tasks was 83.3 (Table 4.1, page IV-4 of the source cited on page 99). Whites scored 85.9, Hispanics 77.6, and Blacks 71.8 percent correct on the average for Document tasks. While 65.4 percent of Whites scored at the 300 skill level or higher, only 37.0 percent of Hispanics and 19.8 percent of Blacks scored at the 300 skill level or higher (see Figure 4.2, page IV-18 of the source document cited on page 99). Note that, if one focusses on the fact that only one in five Blacks were at the 300 skill level or above on the Document scale, one might infer a very low performance level for Blacks on Document tasks. Yet, overall, Blacks performed over 70 percent of the Document tasks correctly. This apparent contradiction results from the fact that to be at the 300 level of skill requires that people possess an 80% probability of being able to perform tasks that are at that level of difficulty. But people with lower levels of skill have a greater than zero probability of being able to correctly perform 300 level tasks. When the latter are taken into consideration, as in calculating the overall average percent correct, then a much greater percentage of the population may be seen to be able to perform Document tasks across the full range of difficulty levels, from easy to hard, than are able to perform tasks at the 300 level of difficulty or above.

FIGURE 76	**Document Literacy ***

The graph below shows predictions of United States energy consumption through the year 2000. Use the graph to answer the questions that follow.



Estimated U.S. Power Consumption by Source

Source: U.S. Department of Interior United States Energy Through the Year 2000.
BTU: Quantity of heat required to raise temperature of one pound of water one degree Fahrenheit.

COPYRIGHT 1973 CONGRESSIONAL QUARTERLY INC.

In the year 2000, which energy source is predicted to supply less power than coal?

A Petroleum
B Natural gas
C Nuclear power
D Hydropower
E I don't know.

(Reduced from original copy)

Task Difficulty: 294

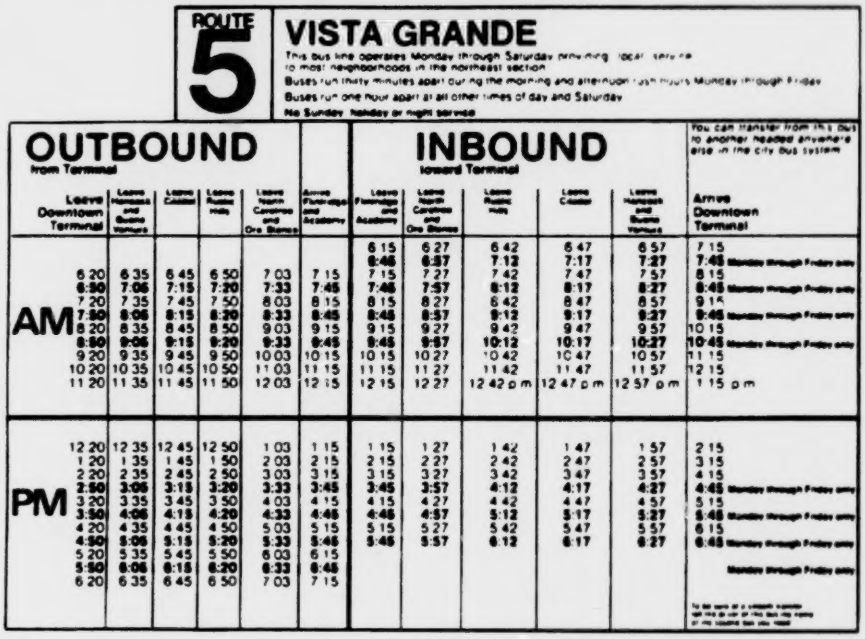
Skill Level of Respondents	294	150	200	250	300	350	400	450
Probability That Respondents at Each Skill Level Can Perform the Task Correctly	80	21	30	55	87	96	99	100

Source: I. Kirsch and A. Jungeblut. (1986a). Literacy: Profiles of America's Young Adults. Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress. (p. 25)

* This item was also used in the 1992 National Adult Literacy Survey (NALS).

FIGURE 77 Document Literacy *

Refer to the following bus schedule for the Vista Grande route.
Use the bus schedule to answer the questions.



ROUTE 5

VISTA GRANDE

This bus line operates Monday through Saturday providing local service to most neighborhoods in the northeast section.
Buses run thirty minutes apart during the morning and afternoon rush hours Monday through Friday.
Buses run one hour apart at all other times of day and Saturday.
No Sunday, holiday or night service.

You can transfer from this bus to another headed anywhere else in the city bus system.

	OUTBOUND from Terminal						INBOUND toward Terminal						
	Leave Downtown Terminal	Leave Hancock and Buena Ventura	Leave Cadiz	Leave Rustic Hills	Leave North Carolina and Oro Blanco	Arrive Flintridge and Academy	Leave Flintridge and Academy	Leave North Carolina and Oro Blanco	Leave Rustic Hills	Leave Cadiz	Leave Hancock and Buena Ventura	Arrive Downtown Terminal	
AM							6 15	6 27	6 42	6 47	6 57	7 15	
							6:45	**6:57**	**7:12**	**7:17**	**7:27**	**7:45**	Monday through Friday only
	6 20	6 35	6 45	6 50	7 03	7 15	7 15	7 27	7 42	7 47	7 57	8 15	
	6:50	**7:05**	**7:15**	**7:20**	**7:33**	**7:45**	**7:45**	**7:57**	**8:12**	**8:17**	**8:27**	**8:45**	Monday through Friday only
	7 20	7 35	7 45	7 50	8 03	8 15	8 15	8 27	8 42	8 47	8 57	9 15	
	7:50	**8:05**	**8:15**	**8:20**	**8:33**	**8:45**	**8:45**	**8:57**	**9:12**	**9:17**	**9:27**	**9:45**	Monday through Friday only
	8 20	8 35	8 45	8 50	9 03	9 15	9 15	9 27	9 42	9 47	9 57	10 15	
	8:50	**9:05**	**9:15**	**9:20**	**9:33**	**9:45**	**9:45**	**9:57**	**10:12**	**10:17**	**10:27**	**10:45**	Monday through Friday only
	9 20	9 35	9 45	9 50	10 03	10 15	10 15	10 27	10 42	10 47	10 57	11 15	
	10 20	10 35	10 45	10 50	11 03	11 15	11 15	11 27	11 42	11 47	11 57	12 15	
	11 20	11 35	11 45	11 50	12 03	12 15	12 15	12 27	12 42 p m	12 47 p m	12 57 p m	1 15 p m	
PM	12 20	12 35	12 45	12 50	1 03	1 15	1 15	1 27	1 42	1 47	1 57	2 15	
	1 20	1 35	1 45	1 50	2 03	2 15	2 15	2 27	2 42	2 47	2 57	3 15	
	2 20	2 35	2 45	2 50	3 03	3 15	3 15	3 27	3 42	3 47	3 57	4 15	
	2:50	**3:05**	**3:15**	**3:20**	**3:33**	**3:45**	**3:45**	**3:57**	**4:12**	**4:17**	**4:27**	**4:45**	Monday through Friday only
	3 20	3 35	3 45	3 50	4 03	4 15	4 15	4 27	4 42	4 47	4 57	5 15	
	3:50	**4:05**	**4:15**	**4:20**	**4:33**	**4:45**	**4:45**	**4:57**	**5:12**	**5:17**	**5:27**	**5:45**	Monday through Friday only
	4 20	4 35	4 45	4 50	5 03	5 15	5 15	5 27	5 42	5 47	5 57	6 15	
	4:50	**5:05**	**5:15**	**5:20**	**5:33**	**5:45**	**5:45**	**5:57**	**6:12**	**6:17**	**6:27**	**6:45**	Monday through Friday only
	5 20	5 35	5 45	5 50	6 03	6 15							
	5:50	**6:05**	**6:15**	**6:20**	**6:33**	**6:45**							Monday through Friday only
	6 20	6 35	6 45	6 50	7 03	7 15							

On Saturday afternoon, if you miss the 2:35 bus leaving Hancock and Buena Ventura going to Flintridge and Academy, how long will you have to wait for the next bus?

A Until 2:57 p.m.
B Until 3:05 p.m.
C Until 3:35 p.m.
D Until 3:57 p.m.
E I don't know.

(Reduced from original copy)

Task Difficulty: 365

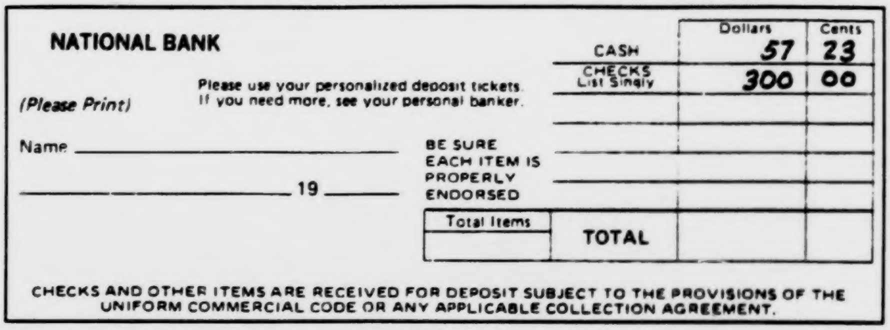
Skill Level of Respondents	365	150	200	250	300	350	400	450
Probability That Respondents at Each Skill Level Can Perform the Task Correctly	80	18	19	21	35	70	93	99

Source: I. Kirsch and A. Jungeblut. (1986a). Literacy: Profiles of America's Young Adults. Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress. (p. 26)

* This item was also used in the 1992 National Adult Literacy Survey (NALS).

FIGURE 78 Quantitative Literacy *

Total the two entries and write the answer in the "total" space. *



NATIONAL BANK

(Please Print)

Please use your personalized deposit tickets.
If you need more, see your personal banker.

Name ____________________

____________________ 19 ______

BE SURE
EACH ITEM IS
PROPERLY
ENDORSED

	Dollars	Cents
CASH	57	23
CHECKS List Singly	300	00
Total Items ☐ TOTAL		

CHECKS AND OTHER ITEMS ARE RECEIVED FOR DEPOSIT SUBJECT TO THE PROVISIONS OF THE UNIFORM COMMERCIAL CODE OR ANY APPLICABLE COLLECTION AGREEMENT.

* Note: In the administration of this task, respondents first had to write the numbers in the spaces provided and then total them.

Task Difficulty: 233

(Reduced from original copy)

Skill Level of Respondents	233	150	200	250	300	350	400	450
Probability That Respondents at Each Skill Level Can Perform the Task Correctly	80	32	63	86	96	99	100	100

Source: I. Kirsch and A. Jungeblut. (1986a). Literacy: Profiles of America's Young Adults. Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress. (p. 31)

* This item was also used in the 1992 National Adult Literacy Survey (NALS).

This Quantitative literacy task has a difficulty level of 233, meaning that people must possess a skill level of 233 to have an 80% probability of being able to perform the task correctly.

On the Quantitative scale, the YALS report states that, over all items,

99.6	percent perform at the 150 level or above,
96.4	percent perform at the 200 level or above,
84.7	percent perform at the 250 level or above,
56.0	percent perform at the 300 level or above,
22.5	percent perform at the 350 level or above,
9.5	percent perform at the 375 level or above.

On the Quantitative literacy scale, the overall percent correct was 65. Whites scored an average of 68.9%, Hispanics 57.8% and Blacks 45.8% correct. Only 47% of the Quantitative literacy tasks were at or below a difficulty level of 300. This contrasts with the Document literacy scale where 73% of the tasks were at or below the 300 level of difficulty. On the Quantitative scale, there were no tasks below a difficulty level of 250. Despite this, the theoretical curves relating ability to the 80% probability of being able to perform tasks at different difficulty levels leads to the reported (hypothetical) finding that 96.4%, and not 100%, of young adults would perform at the 200 level or above. This occurs even when there are, in fact, no items at the 150 or 200 levels.

Note: In the assessment of Job Training Partnership Act (JTPA) opportunities and job seekers using the Unemployment Insurance (UI) systems, this item required "the reader to enter and total two numbers "on the bank deposit slip." It is cited as having a difficulty level of 226 (I.Kirsch, A. Jungeblut, and A. Campbell, (1992, September). Beyond the School Doors: The Literacy Needs of Job Seekers Survival by the U.S. Department of Labor. Washington, DC: U.S. Dept. of Labor, Employment Training Administration. (p. 51)

FIGURE 79 Quantitative Literacy *

Complete the check ledger for the month of September. Keep a running total of the balance and include the following:

$50 deposit on 9/27
check 108 payable to Mr. Davis for $18.49 on 9/27
check 109 payable to Electric Co. for $53 on 9/28
the $5 monthly service fee for your checking account

RECORD ALL CHARGES OR CREDITS THAT AFFECT YOUR ACCOUNT

NUMBER	DATE	DESCRIPTION OF TRANSACTION	PAYMENT / DEBIT (−) $		✓ T	FEE (IF ANY) (−) $	DEPOSIT/CREDIT (+) $		BALANCE $	
									130	15
107	9/25	Martin's Grocery	24	76					105	39
	9/26	Paycheck					375	10	480	49

Task Difficulty: 293

(Reduced from original copy)

Skill Level of Respondents	293	150	200	250	300	350	400	450
Probability That Respondents at Each Skill Level Can Perform the Task Correctly	80	00	04	33	85	99	100	100

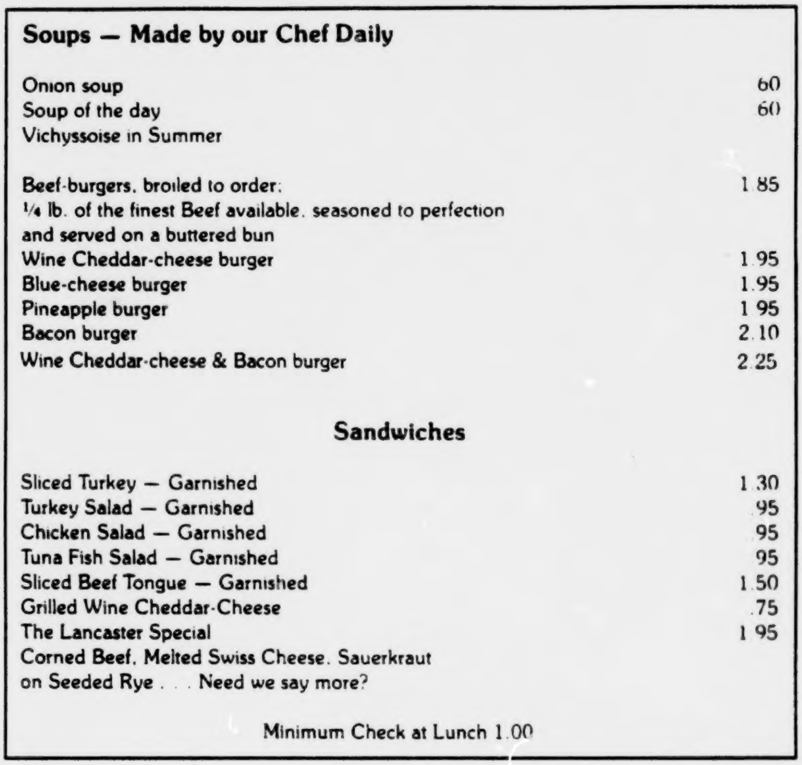
Source: I. Kirsch and A. Jungeblut. (1986a). Literacy: Profiles of America's Young Adults. Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress. (p. 32)

* This item was also used in the 1992 National Adult Literacy Survey (NALS).

FIGURE 80 Quantitative Literacy *

Suppose you had $3.00 to spend for lunch.

If you order a Lancaster Special sandwich and onion soup, how much change should you get back?____________________



Soups — Made by our Chef Daily

Onion soup	60
Soup of the day	60
Vichyssoise in Summer	
Beef-burgers, broiled to order: ¼ lb. of the finest Beef available, seasoned to perfection and served on a buttered bun	1 85
Wine Cheddar-cheese burger	1 95
Blue-cheese burger	1.95
Pineapple burger	1 95
Bacon burger	2.10
Wine Cheddar-cheese & Bacon burger	2 25

Sandwiches

Sliced Turkey — Garnished	1 30
Turkey Salad — Garnished	95
Chicken Salad — Garnished	95
Tuna Fish Salad — Garnished	95
Sliced Beef Tongue — Garnished	1.50
Grilled Wine Cheddar-Cheese	.75
The Lancaster Special Corned Beef, Melted Swiss Cheese, Sauerkraut on Seeded Rye . . . Need we say more?	1 95

Minimum Check at Lunch 1.00

(Reduced from original copy)

Task Difficulty: 337

Skill Level of Respondents	337	150	200	250	300	350	400	450
Probability That Respondents at Each Skill Level Can Perform the Task Correctly	80	01	06	23	57	86	96	99

Source: I. Kirsch and A. Jungeblut. (1986a). Literacy: Profiles of America's Young Adults. Princeton, NJ: Educational Testing Service. National Assessment of Educational Progress. (p. 33)

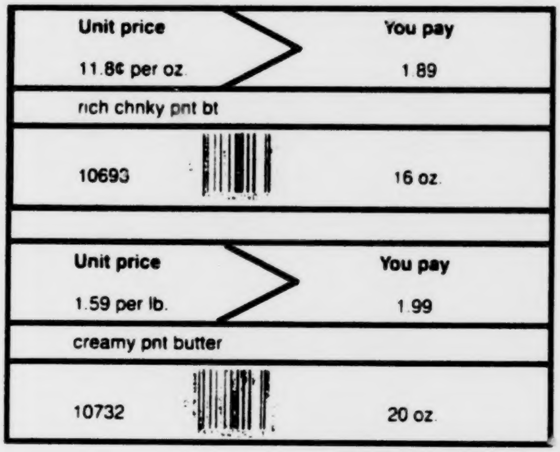
* This item was also used in the 1992 National Adult Literacy Survey (NALS).

FIGURE 81	**Quantitative Literacy ***

You need to buy peanut butter and are deciding between two brands.

Estimate the cost per ounce of the creamy peanut butter. Write your estimate on the line provided. ____________________

Circle the letter next to the more economical brand.



A.

Unit price **You pay**

11.8¢ per oz 1.89

rich chnky pnt bt

10693 16 oz.

B.

Unit price **You pay**

1.59 per lb. 1.99

creamy pnt butter

10732 20 oz.

(Reduced from original copy)

Task Difficulty: 376

Skill Level of Respondents	376	150	200	250	300	350	400	450
Probability That Respondents at Each Skill Level Can Perform the Task Correctly	80	02	06	18	41	69	88	96

Source: I. Kirsch and A. Jungeblut. (1986a). Literacy: Profiles of America's Young Adults. Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress. (p. 34)

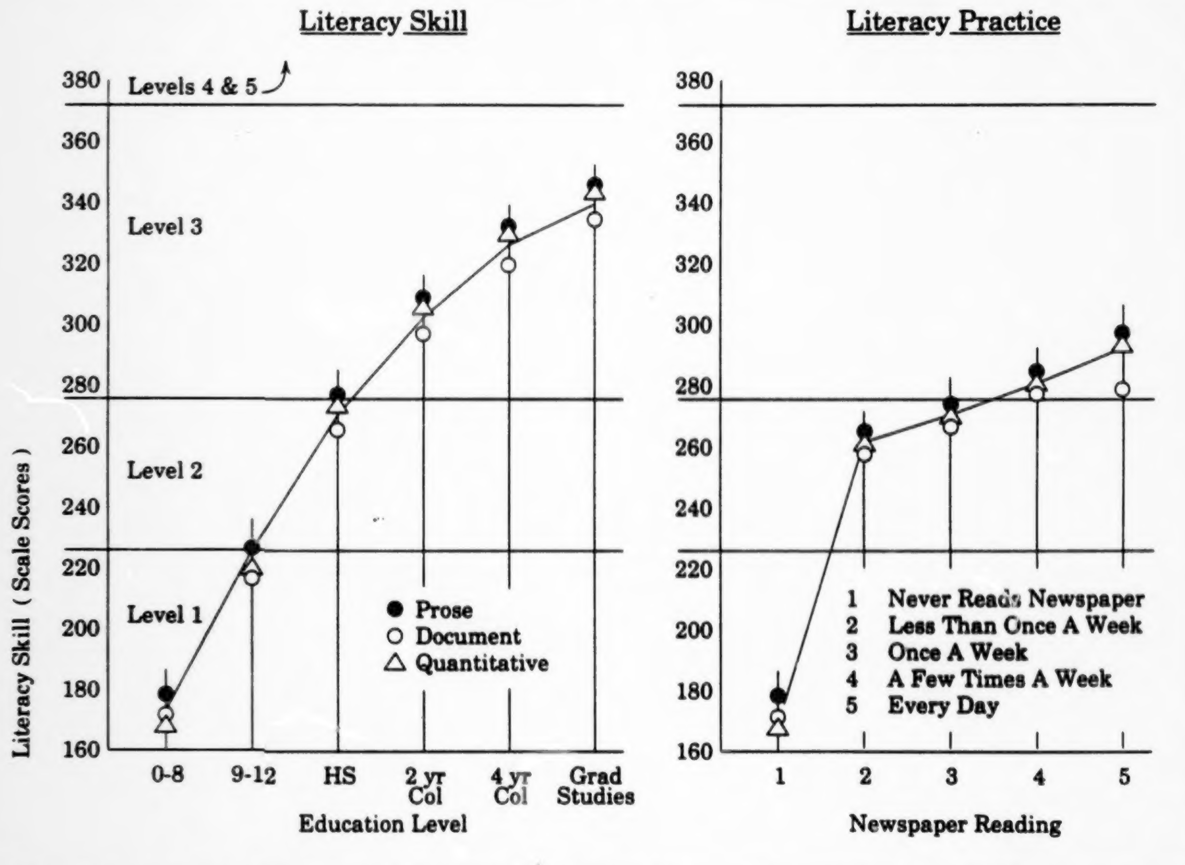
* This item was also used in the 1992 National Adult Literacy Survey (NALS).

National Adult Literacy Survey - 1993

In 1993 the National Center for Education Statistics of the U. S. Department of Education reported the results of a survey of the literacy skills of adults aged 16 to over 65 living in households in the United States. Additionally, the survey studied the literacy skills of incarcerated adults. The National Adult Literacy Survey (NALS) used the same prose, document, and quantitative scales as used in the Young Adult Literacy Survey (YALS). Many of the same test items as were used in the YALS were also used in the NALS. Pages 100 through 112 present samples of items from the YALS that were also used in the NALS. Additional items were also developed for the NALS. Literacy scores were reported using the scale scores for the three different domains of literacy tasks: prose, document, and quantitative. Just as with the YALS, the scale scores used in the NALS for each of the three different types of literacy task domains ranged from 0 to 500, with the majority of tasks (items) falling between 200 and 400.

The 1993 report of the NALS available at the time this report was prepared did not give data on the percent of young adults who performed various literacy tasks correctly. Nor did the report indicate how literacy practices varied as a function of years

FIGURE 82 **National Adult Literacy Survey**



Source: Irwin Kirsch, A. Jungeblut, L. Jenkins, & A. Kolstad (1993, September). *Adult Literacy in America: A First Look at the Results of the National Adult Literacy Survey.* Washington, DC: U. S. Government Printing Office.

of education. Therefore, to show how performance on the NALS compares with earlier adult literacy assessments, the left side of figure 82 shows skill levels on the prose, document, and quantitative tasks in terms of scale scores for people at different levels of education. The figure also shows on the right how scale scores varied for people who engaged in various amounts of one literacy practice: newspaper reading. Both the skill and practices data resemble the findings of Buswell in 1937 (page 43), the Adult Functional Reading Study of 1973 (page 63) and the Young Adult Literacy Survey (page 99) in showing that people with more education have higher reading skills, and that people who read the newspaper more also have higher reading skills. This confirms the earlier findings that skill, practice and education are interrelated. Future reports from the NALS are planned that will discuss additional relationships among education, literacy skills, and literacy practices.

The NALS Literacy Levels

The NALS was the first national survey of adult literacy skills to report data in terms of five levels of skill. These literacy categories are much like the categories used by the military since World War I to categorize a range of scores obtained by young adults into categories of "intelligence" (Army Alpha and Beta tests, see page 19 of this report), "general learning ability" (Army General Classification Test (AGCT), see page 25), and "trainability" (Armed Forces Qualification Test (AFQT), (see page 27).

The NALS literacy levels are important because they are to be used by the National Governor's Association and the federal government to track the nation's progress on Education Goal Number 5: making all adults literate by the year 2000 (National Education Goals Panel, 1992, pp. 40-43).

In the NALS, the five levels used to describe categories of proficiency include Level 1 (scale scores from 0 to 225), Level 2 (scale scores from 226 to 275), Level 3 (scale scores from 276 to 325), Level 4 (scale scores from 326 to 375), and Level 5 (scale scores from 376 to 500). For each of the prose, document, and quantitative scales, all those adults with scores from 0 to 225 were assigned to Level 1, those with scores from 226 to 275 were assigned to Level 2 and so forth. Table 4 shows the percentage of adults assigned to each of the five literacy levels for each of the three literacy scales.

Altogether, the adult population sampled represented approximately 191,000,000 adults. The data in Table 4 suggest that some 40 to 44 million adults are in the lowest level of skill, Level 1. Some 50 million are in Level 2, 61 million in Level 3, 28 to 32 million in Level 4 and 6-8 or so million adults are in Level 5.

Being assigned to one of the five levels means that people at the average skill for a given level have an 80 percent probability of being able to perform the average tasks at the given level. For instance, the NALS report indicates that a person with a skill level of 200 would be assigned to Level 1, for which the average task difficulty is about 200 (averaged across the three literacy domains). This means that the person would be expected to be able to respond correctly to 80 percent of the average tasks in Level 1. However, this same person would be expected to be able to correctly respond to over 30 percent of the tasks at Level 2, about 15 percent of the tasks at level 3, 8 percent of the tasks at Level 4 and about 5 percent of the tasks at Level 5 (Kirsch, Jungeblut, Jenkins, & Kolstad, 1993, p. 102). This results from the fact that, as indicated in the discussion of items for the YALS survey earlier, persons with skill levels below the difficulty level of an item may be able to perform the item correctly, though with a less than 80 percent probability of a correct response.

The Prose Literacy task item illustrated on page 101 shows that a person needs a skill level of 279 to have an 80 percent probability of being able to perform the item that is of 279 difficulty.

TABLE 4 **NALS Survey Percentage Levels**

Percentage of adults in each of the five NALS skill levels for each literacy scale.

	Level 1	Level 2	Level 3	Level 4	Level 5
Prose	21	27	32	17	3
Document	23	28	31	15	3
Quantitative	22	25	31	17	4

However, the person with a skill level of 250 has a probability of .62 of being able to perform the item. Because the person has a skill level of 250, on the NALS this would result in the person being assigned to Level 2. This would mean that the person has a .80 probability of being able to perform average Level 2 tasks. But note that the person would also be able to perform Level 3 tasks (which is where a task of 279 difficulty would fall), but not with as high a probability of success. In the NALS report, it is indicated that on either the prose, document or quantitative tasks, a person with a skill level of 250 can be expected to perform 50 out of 100 tasks that are at the average Level 3 task, 25 to 30 percent of the tasks at Level 4 and 10 to 20 percent of the tasks at Level 5, depending on the type of literacy scale under discussion (Kirsch, et. al. 1993, p. 102).

By assigning people to a given skill level, the impression may be formed that the person has *no* ability to perform higher level tasks. But this is wrong. Even though people may be assigned to a lower skill level, this does not mean that they are totally incapable of performing tasks at higher skill levels. In the NALS survey, respondents were asked to rate themselves as to how well they thought they could read and write English. Of those categorized as Level 1 literates, some 66 to 75 percent said they could read and write "well" or "very well." The NALS authors refered to this as the "gap between performance and perception," meaning that the literacy skills of those in Level 1 are low by NALS methods of setting standards for inclusion at one or another level of skill. So the self-perceived skills of the vast majority of those categorized as Level 1 literates, who rated themselves as "well" or "very well" as literates, must be incorrect. They go on to say that "Such a mismatch may well have a significant impact on efforts to provide education and training to adults: Those who do not believe they have a problem will be less likely to seek out such services or less willing to take advantage of services that might be available to them." (Kirsch, et. al. 1993, p. 20).

But it is possible that many adults labled as Level 1 literates perceive themselves as quite literate because, as indicated above, they *are* able to perform quite a few tasks at higher levels, even a few at Level 5. It must be kept in mind that simply because people are assigned to a lower level category of literacy skill, this does not mean that they are entirely incapable of performing tasks at higher skill levels. They simply do not have a .80 probability of performing higher level tasks. That is, they cannot perform them with the same high level of probability that is required to be categorized at a higher level. This is important to keep in mind when one discusses the numbers of adults in the different skill levels. The numbers can be changed dramatically simply by changing the criterion for being categorized into the different levels. For instance, if instead of requiring that people be able to do 80 percent of the average tasks in a given level, the criterion were changed to being able to do 70 percent of the tasks, then the numbers of people assigned to the lower levels would decrease dramatically.

By using the method of "literacy levels" to categorize people's literacy skills, one may be led to conclude that people assigned to a given level of skill cannot perform the more demanding types of tasks found at higher levels of skill. Yet that is incorrect and provides an inaccurate indication of the full range of people's literacy skills. Quite possibly, people's perceptions of their literacy ability may be more accurate than the impressions that might be created by the use of the five NALS literacy levels.

Some Major Findings from the NALS

The NALS reported data on the literacy scores of adults across a wide range of age, for persons with special health conditions, for ethnic groups, and for incarcerated populations. Some of the key findings for each of these groups are summarized below.

Literacy and Age

The NALS report indicated that, generally, both education and literacy skills increased for adults from ages 16-18 up to ages 40-54, and then skills dropped rapidly. Adults 55 -64 and those 65 or older performed well below the levels of younger adults, even though their average years of education was not much different from the 16-18 year olds. Summarizing across the three literacy scales, about 44-48 percent of those adults categorized in Level 1 were aged 55 or older, and 32-35 percent were 65 years old or older. Some 28-32 percent of those in Level 2 were 55 years old or older, and 16-18 percent were 65 or older.

From the NALS data it is not possible to say whether adults' literacy skills rise and then decline or whether the various age groups have performed at the levels indicated throughout adulthood. This would require longitudinal studies. However, referring to the human cognitive system of page 4 of this report, the NALS tasks do impose heavier burdens on working memory as they increase in difficulty. In fact, this may be one of the major reasons the tasks increase in difficulty. The authors of the NALS report note that, of several variables that might make tasks more difficult, two of the variables for prose and document tasks are the number of categories or features of information that the reader has to process or match, and the number of categories or features of information in the document that can serve to distract the reader or that may seem plausible but are incorrect. In the quantitative tasks, the number of operations needed to perform the task is given as a factor that may influence the difficulty of the task (Kirsch, et. al, 1993, pp. 74, 85, & 94).

Generally, holding features or categories of information in short term or working memory and then searching through other information places greater demands upon working memory, and there is considerable evidence that working memory performance declines with increasing age (Bernstein, Roy, Srull, & Wickens, 1988, p. 401). This may explain, at least in part, the decrease in literacy skills as age increases.

As indicated in the human cognitive system model, one of the factors that is important for literacy is one's organized bodies of knowledge. The bodies of knowledge are what makes it possible to comprehend printed displays, to reason analogically (i.e., from one body of knowledge to another), and to make inferences (i.e., going from the information given in the display to another body of knowledge in one's mental knowledge base to create yet a third domain of knowledge needed to correctly perform an inference-type task). Generally, these organized bodies of knowledge continue to develop across adulthood and tend to resist deterioration in older age (Bernstein, et. al, 1988, p. 401). While the NALS includes tasks that include knowledge content from health, consumer economics, and others, it does not systematically assess people's organized bodies of knowledge in any domain (e.g., health, science, government, etc.). It is not possible to know whether poorly performing people's primary problems may be their lack of knowledge (e.g., vocabulary, concepts, etc.) or of working memory control, or both. But the rapid decline in performance with ages above 55 suggests a strong component of working memory control in the NALS tasks.

Health Conditions

A major contribution of the NALS was the sampling of adults with various forms of physical, mental or other health conditions. The survey reported that 12 percent of the adult population reported some type of health problem. Significantly, as a type of epidemiological indicator of the self-perceived extent of adult learning difficulties in the U. S. population, some 3 percent (7.5 million) of adults reported that they suffered from learning disabilities. Around 60 percent of these adults scored in Level 1, and some 22 percent scored in Level 2. Overall, the average scores for those self-reporting that they had a learning disabilty were: prose-207; document- 203; and quantitative- 200.

Less than one-half of one-percent reported that they were mentally retarded. Eighty-six to 89 percent of these adults were placed in Level 1, with average scores of: prose-143; document-147; and quantitative- 117.

TABLE 5 **NALS Survey Percentage Levels**

Percentage of race / ethnic group members
in each of the five NALS skill levels for the prose literacy scale.

	Level 1	Level 2	Level 3	Level 4	Level 5	Average Proficiency
White	14	25	36	21	4	286
Black	38	37	21	4	0 *	237
Hispanic:						
Mexican	54	25	16	5	0 *	206
Puerto Rican	47	32	17	3	0 *	218
Cuban	53	24	17	6	1	211
Central / So. America	56	22	17	4	0 *	207
Hisp. Other	25	27	33	13	2	260
Asian / Pacific Islander	36	25	25	12	2	242
Amer. Indian / Alaskan Nat.	25	39	28	7	1	254

* percentages less than 0.5 rounded to zero.

Race Ethnicity

The NALS provides the most extensive data on the largest numbers of race-ethnic groups of any previous survey. Table 5 shows the percentage of race-ethnic groups falling into each of the five levels of the NALS prose scales. Large percentages (20-89) of Hispanics from the various regions were born outside the United States and generally had Spanish as their primary language. For the most part, the Hispanic groups with large numbers born outside the United States performed more poorly than Blacks on the literacy scales. This is a reversal from the findings of the young adult literacy survey. In that survey, however, people who could not read English were excluded from the survey. Because Hispanics born in the United States are more likely to speak and read English, their scores are higher on the literacy scales. For instance, in the table above, the Hispanic / Other category includes those who were mostly (68 percent) born in the United States, and their scores are higher than the scores for Blacks. Large percentages (78) of Asian/Pacific Islanders were also born outside the United States. A category of "Other" is also given in the NALS report but is not included in Table 5.

Across the age span, Hispanics (grouped together) had fewer years of education (average of 10.2 years) than did Whites (12.8) or Blacks (11.6). Through ages 55-64 Asian/Pacific Islanders had the most years of education (average of 13 years), while among those over age 65, Whites had the most education.

Incarcerated Population

The NALS included a national sample of inmates in federal and state prisons. The sample confirmed what is widely understood in showing that the prison population tends to be quite different demographically than the general adult population. For example, the prison population was mostly males (94 percent), 80 percent were below the age of 40, they were less White (35 percent), more Black (44 percent) and Hispanic (17 percent), and less well educated (49 percent with less than a high school education).

The prison population scored lower on literacy than the general adult population. The average scale scores for the three literacy scales were: prose-246 (272 for the general adult population), document-240 (267 general adult population), and quantitative-236 (271 general adult population). In terms of the NALS literacy levels, looking across the three literacy scales, some 31 to 40 percent of inmates were in Level 1, 32-38 percent in Level 2, 22-26 percent Level 3, 4-6 percent Level 4, and less than 0.5 to 1 percent in Level 5.

Poverty, Income, Occupational Status, and the Intergenerational Transfer of Literacy

The NALS confirmed other studies going back over the decades in showing that the less literate are more likely to be found in poverty, on welfare, unemployed or employed in poorly paying jobs, and in the lower status jobs that require less education (see page 135 of this report) .

The intergenerational effects of parent's education level on the adult's literacy level was also replicated in the NALS . Adults whose parents had completed a four year college degree were nine times more likely to have completed a college degree themselves than were adults whose parents had 0-8 years of education (46 percent versus 5 percent).Thirty-two percent of adults whose parents had completed 0-8 years of education had themselves completed only 0-8 years of education, whereas only 5 percent of adults whose parents had completed high school reported that they themselves had completed only 0-8 years of education. Some caution in interpreting these data is called for because the NALS included some 16 to 18 year olds who were still in school. See pages 127-131 of this document for more on the intergenerational transfer of literacy.

References

Douglas Bernstein, E. Roy, T. Srull, & C. Wickens (1988). *Psychology*. Boston: Houghton Mifflin.

Irwin Kirsch, A. Jungeblut, L. Jenkins, & A. Kolstad (1993, September). *Adult Literacy in America: A First Look at the Results of the National Adult Literacy Survey*. Washington, DC: U. S. Government Printing Office.

National Education Goals Panel (1992). *The National Education Goals Report: Building a Nation of Learners*. Washington, DC: U. S. Government Printing Office.

PART 2

PART 2

SPECIAL TOPICS

LISTENING AND READING IN ADULT LITERACY

THE INTERGENERATIONAL TRANSFER OF LITERACY FROM PARENTS TO CHILDREN

LITERACY, OCCUPATIONAL STATUS AND JOB PERFORMANCE

According to the developmental model of literacy outlined in the introduction to this Compendium, children typically acquire considerable competence in listening and comprehending speech before they develop competence in reading and comprehending the written language. Indeed, the whole idea behind the teaching of "phonics" and other "word attack" techniques is that the learner's main task is to learn how to "decode" the written language to recover the spoken language which can then be comprehended as usual.

The idea that listening competence develops first and then reading competence permits the learner to understand in writing that which could earlier be understood only in the spoken language leads to the concept of "reading potential." Figure 83 illustrates the concept for school children. The general notion is that children enter school at the first grade with two types of communication abilities: listening and reading (there are, of course, other communication abilities, but they are not the object of discussion here). By definition, the average listening ability of first graders is designated as first grade listening ability. The average reading ability of first graders is designated as first grade reading ability. These are the "normative" designations of listening and reading skills.

Figure 83 shows the hypothetical case of a child with normative listening and reading levels at the second grade. However, as the figure illustrates, if the child could read as well as he or she listens, then the "reading potential" score would be at the third grade level.

The concept of "reading potential" is important for adult literacy for at least two reasons. First, whether people are designated as "learning disabled" or not is generally based on the idea that on some measure, such as an "intelligence" test, the people are at their appropriate age level or above, but on a reading measure they are two or more years behind. In other words, they are not reading "up to their potential." Listening tests are one way of assessing people's "reading potential."

The second reason that the concept of "reading potential" is important in adult literacy education is that it is frequently thought that adults in need of literacy education have lived a reasonably long time and developed fairly high levels of competence in oral language, including vocabulary and comprehension ability for listening. Therefore, unlike children, whose oral language skills are not well developed yet and who must acquire higher levels of vocabulary while also learning to read, adults will be able to acquire a fairly high level of literacy in a brief time, relative to that required by children. This leads to the expectation that the adult's literacy problems may be solved fairly quickly with a relatively brief period of training in some form of decoding the written word to recover the vast amount of competence already possessed in the oral language.

However, as the data for Figure 84 indicate, when some 2,000 adults were assessed to compare their skills in both listening and reading, the anticipated higher level of listening ability, particularly at the lower levels of reading as indicated by the Gates-MacGinitie reading test, did not emerge when listening to comprehend paragraphs. While the vocabulary tests did show greater skill by listening, it appears that that was due to the fact that in the listening vocabulary test, the test was administered both by listening and by reading. In this case, then, people were paced to complete the entire vocabulary test by the spoken words on the listening test. This appears to have provided an indication of greater vocabulary ability than when vocabulary was assessed only by reading.

The data of Figure 84 were obtained using group administered tests in which the listening and reading measures were equated as closely as possible in content, time to listen or read, and difficulty of the questions, which were all multiple-choice requiring recall of factual information.

The chapter by Sticht and James (1984) provides an extensive review of listening and reading studies with adults. In one study, using the same test as used to obtain the data in Figure 84, an incarcerated prison population of men reading at the 4th grade level showed about 1.5 grade levels of "potential" as derived in Figure 83.

Using a different group administered test of listening and reading skills, the Durrell Listening and Reading Series tests, Sticht (1978) reported that for 71 native speakers of English who were in an adult literacy program their average reading level was at the 4.8 grade level, while their reading "potential" (listening transformed to reading as in Figure 83) was 6.0. Interestingly, for 45 adults with English as a second language, their reading score was 4.8 while their reading "potential" score was at the 4.4 grade level. In other words, their listening skills were lower than their reading skills, so when the listening score was converted to a reading "potential" score, they performed below their actual reading level.

Using the Diagnostic Reading Scales, which are administered one-on-one as an individual test, Sticht & Beck (1976) assessed the reading "potential" of 42 native English speakers and 32 English as a second language speakers in an adult literacy program. The native speakers had an average reading level at the 6.2 grade level and a "potential" at the grade 6.4 level. The non-native English speakers read at an average 4.3 grade level and had a "potential" at the 4.4 grade level.

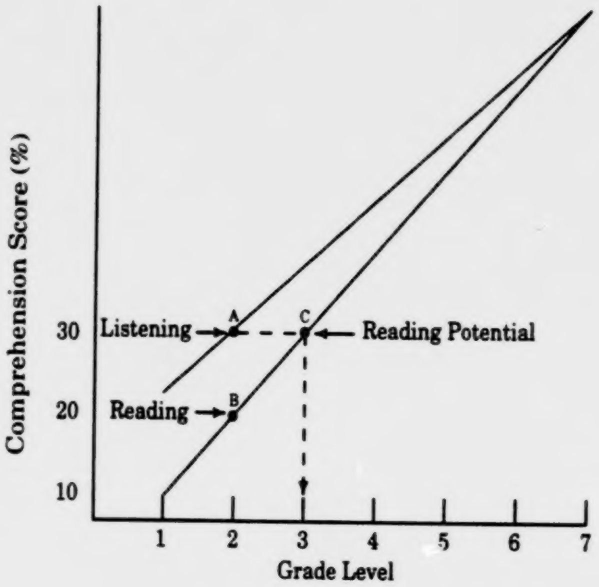
Generally speaking, as the data of Figure 84 and the studies cited above suggest, adults with lower levels of literacy tend to also have lower levels of oral language (listening) comprehension. This appears to be true for both vocabulary knowledge and the comprehension of connected discourse. Of course, there can be important exceptions to these general trend data. But as a rule, these data on listening and reading suggest that adult literacy educators will have to provide extensive opportunities for adult learners to develop considerable bodies of knowledge to improve both their oral and written language comprehension skills to the higher levels.

Reference

Sources for all of the studies cited above, and many others exploring listening and reading skills of adults, may be found in:

Thomas G. Sticht & J. H. James (1984). Listening and Reading. In P. Pearson, R. Barr, M. Kamil, and P. Mosenthal (Eds.) *Handbook of Reading Research.* New York: Longmans.

FIGURE 83 **Listening And Reading - The "Reading Potential" Concept**



A - Indicates the normative listening score for the 2nd grade, called listening at the 2nd grade level.

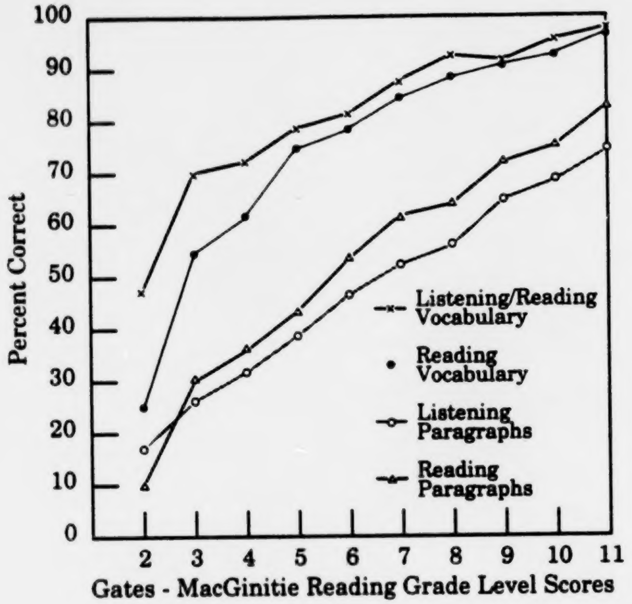
B - Shows the normative reading score for the 2nd grade, called reading at the 2nd grade level.

C - Shows conversion of the normative listening score to a reading "potential" score by drawing a horizontal from A to intersect with the reading curve, and then dropping a perpendicular line to the abscissa.

The example shows a reading potential score of 3rd grade.

Thus, the case illustrated shows a person listening and reading at the 2nd grade level, with a reading potential score of 3rd grade level.

FIGURE 84	**Listening And Reading - Gates / MacGinitie**



Listening and Reading test performances of applicants for military service on the Air Force's Literacy Assessment Battery (LAB). Data are presented for the Vocabulary and Paragraph subtests of the LAB. Except for those applicants who scored at the 2nd grade level on the Gates - MacGinitie reading test, average scores were higher for reading than listening.

Source: Sticht, T., Hooke, L., & Caylor, J. (1982, March). Literacy, Oracy, and Vocational Aptitude as Predictors of Attrition and Promotion in the Armed Services. Professional Paper 2-82: Alexandria, VA: Human Resources Research Organization.

THE INTERGENERATIONAL TRANSFER OF LITERACY FROM PARENTS TO CHILDREN

A consistent finding across all the adult literacy surveys from 1917 to 1992 reviewed in Part 1 is that the more education people have, the more reading of books, magazines, and newspapers they do, and the more highly skilled they are.

In this section of the Compendium, we introduce another salient finding across adult literacy surveys for the last quarter of a century. People with more highly educated *parents* are, themselves, likely to become the more highly educated, more extensively read, and highly skilled of the next generation.

Regarding the relationship between parent's education and the next generation's reading skills, Figure 85 shows reading skill data for 9, 13, and 17 year olds as well as young adults 25-35 years old. These data were obtained by the National Assessment of Educational Progress (NAEP) in the early 1970s (see sources cited at Figure 85). In the NAEP survey, children and adults were tested on 8 different reading "themes" or skill areas, ranging from word meanings (vocabulary knowledge) to critical reading. As Figure 85 shows, regardless of the type of reading skill assessed, and at all ages, as parent's education increased, reading proficiency increased.

In Figure 86, data from the 1985 survey of young adult literacy skills are presented showing proficiency on the NAEP Prose literacy scale (see page 129). The figure shows parent's education levels on the horizontal (X) axis and the young adult's own years of education inside the figure. For instance, for parents with only 0-8 years of education and their adult children with only 0-8 years of education, the average Prose literacy score is 233. As the parent's education level increases, there is not much improvement in the proficiency of young adults with only 0-8 years of education. However, as the young adult's own education increases from 0-8 years of education, to some high school (HS), to post high school and to possession of a college degree, there is an interaction with parent's education level. The greater the parent's education and the greater their adult children's education, the higher the reading proficiency.

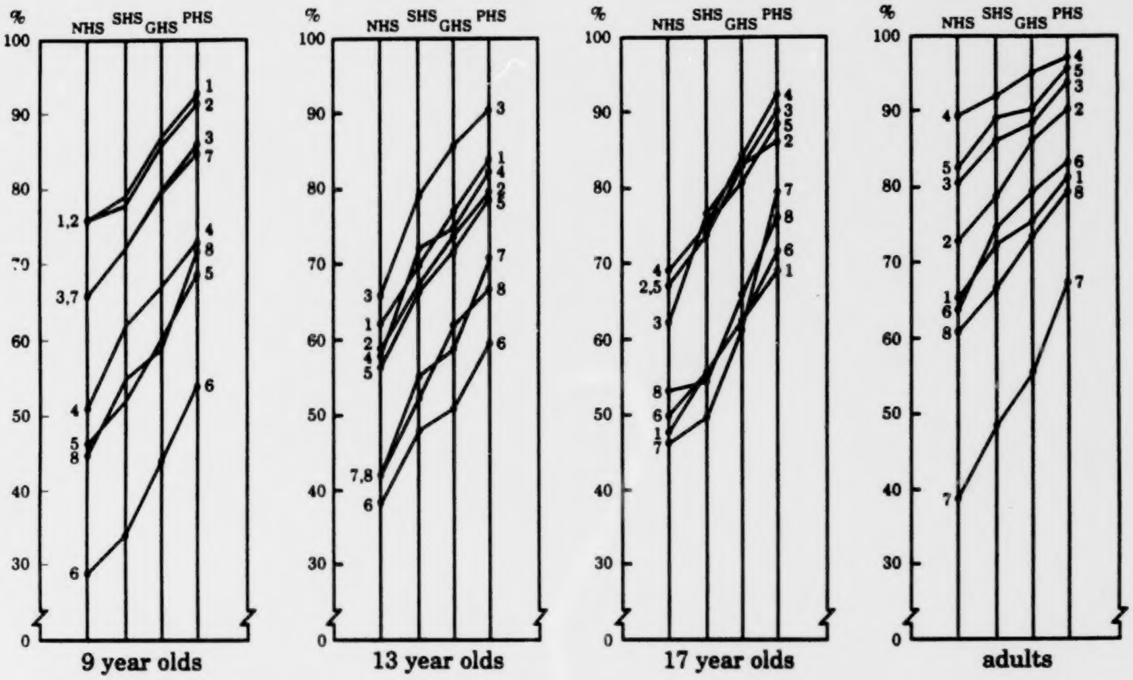
Figure 87 shows the relationships of mother's education to performance on the Armed Forces Qualification Test of 1980 for Whites, Hispanics and Blacks. Similar data are presented in Figure 88 for the 1985 NAEP survey of young adult literacy skills.

The data on the intergenerational transfer of literacy from parents to their children has provided a large part of the evidence to argue for "intergenerational literacy" or "family literacy" adult education programs. Today, both the federally-funded Head Start and Even Start programs aim to promote the intergenerational transfer of literacy from parents to children through family literacy programs.

FIGURE 85 Median Percentages of Success for Parental Education by Themes

Parent's Education

NHS	SHS	GHS	PHS
No High School	Some High School	Graduate / High School	Post High School



THEMES

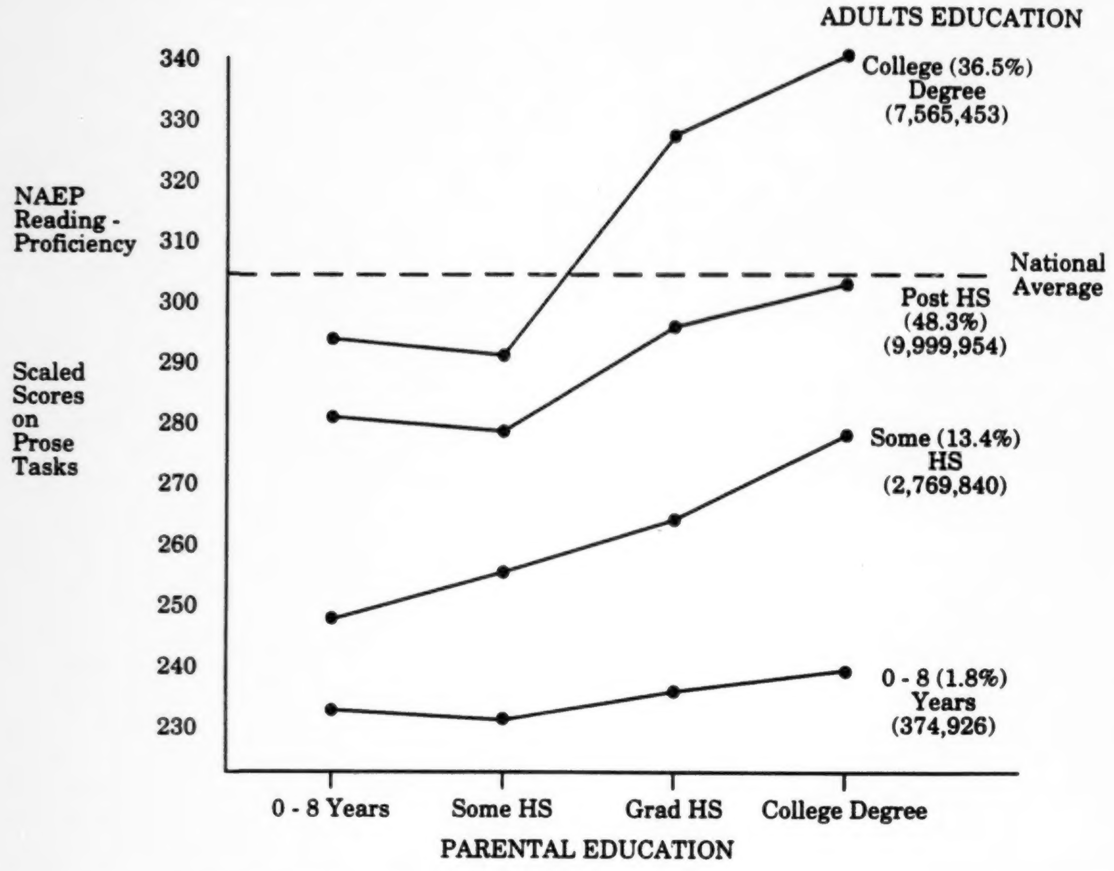
( ) = No. of Exercises

1. Word Meanings
2. Visual Aids
3. Written Directions
4. Reference Materials
5. Significant Facts
6. Main Ideas
7. Inferences
8. Critical Reading

Data From the National Assessment of Educational Progress Showing Relations of Parent Education Level to Reading Task Performance

Source: National Assessment of Educational Progress. Preliminary Report 02-R-00 Reading Summary, 1972, Washington, DC: U. S. Department of Education, pgs.32, 28, 105, and 145.

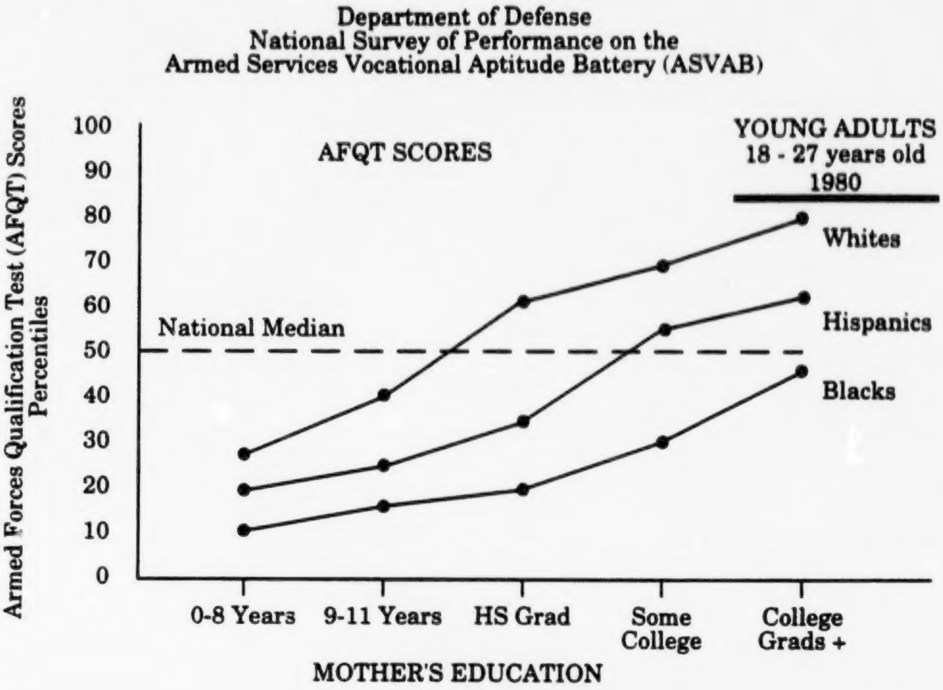
FIGURE 86 **Performance Of Young Adult And Parental Education**



Performance of Young Adults (21-25 years of age) on the 1985 NAEP Prose Scale of Reading Proficiency as a Function of Parental Education (higher of mother's or father's) and the Person's Own Years of Education

Source: Kirsch, I. and Jungeblut, A. (1986, September). Literacy: Profiles of American Young Adults. Final Report. Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress, (pp. C-22, 23).

FIGURE 87 **Armed Forces Qualification Tests - 1980**

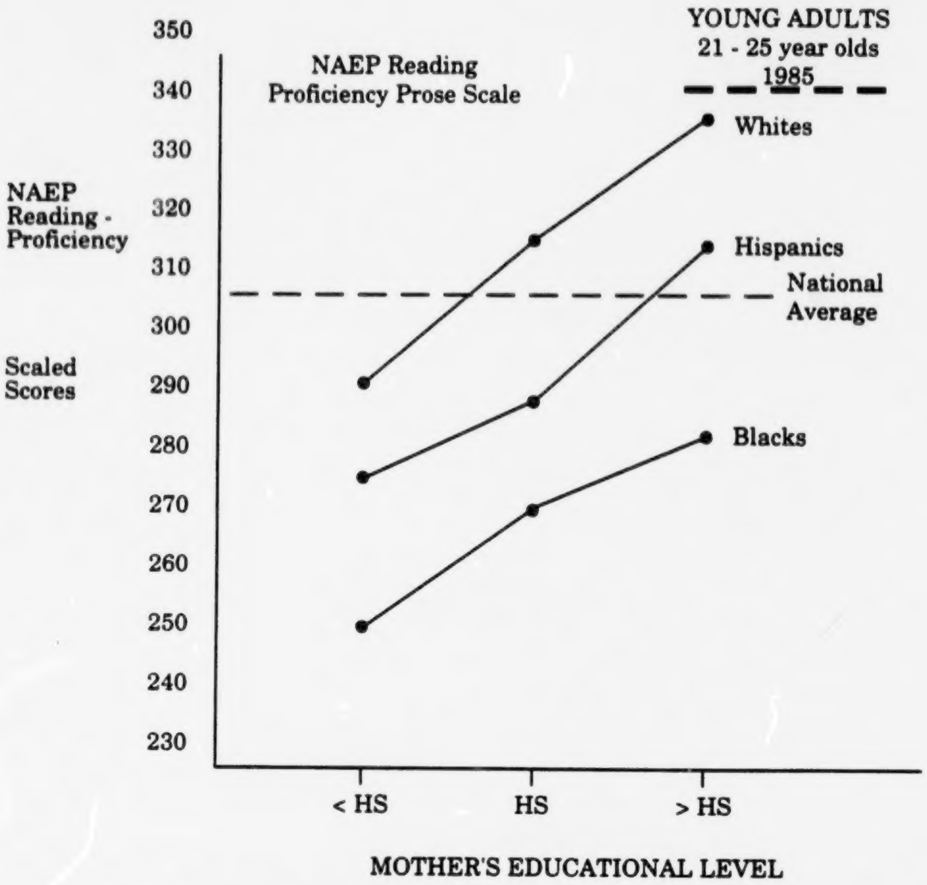


AFQT	CORRESPONDING BASIC SKILLS	
• Word Knowledge	• Vocabulary	READING
• Paragraph Comprehension	• Comprehension	
• Arithmetic Reasoning	• Word Problems	MATHEMATICS
• Numerical Operations	• Add, Subtract, Multiply & Divide	

Performance of Blacks, Hispanics, and Whites on the 1980 Armed Forces Qualification Test of Reading (Word Knowledge and Paragraph Comprehension) and Mathematics (Numerical Operations and Arithmetic Reasoning - Word Problems) as a function of Mother's Education Level.

Source: Profile of American Youth: 1980 Nationwide Administration of the Armed Services Vocational Aptitude Battery. (1982, March). Washington, DC: U. S. Department of Defense, Office of the Assistant Secretary of Defense (Manpower, Reserve Affairs, and Logistics.). Table C-3, p.79.

FIGURE 88 Mother's Educational Level And Performance Of Young Adults



**Performance of Blacks, Hispanics, and Whites
on the 1985 NAEP Reading Proficiency Prose Scale
as a Function of Mother's Education Level**

Source: Kirsch, I. and Jungeblut, A. (1986, September). Literacy: Profiles of American Young Adults. Final Report. Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress, (pp. C-26).

LITERACY, OCCUPATIONAL STATUS AND JOB PERFORMANCE

Relationships among "intelligence," "aptitude," and "achievement" test scores, such as literacy tests, and occupational status have been repeatedly studied over the last seventy-five years. The data presented in Figure 89 illustrate the trends in such studies. The upper part of the figure shows data from World War I in which "intelligence" and occupational status was studied. The tests used to measure "intelligence" were the Army Alpha and Beta tests discussed in Part 1 of this Compendium.

The bottom part of Figure 89 shows data from the 1986 survey of young adult literacy skills (see pages 99 through 112 of this Compendium) relating "literacy" to occupational status. The trends for 1917 and 1986 are similar: whether one calls the tests measures of "intelligence" or of "literacy," laborers tend to perform more poorly than sales or clerical workers who, in turn, perform more poorly than technical and professional workers.

Figure 90 presents data from the 1986 study of the literacy skills of young adults in relation to the number of jobs that are projected to be available in the year 2000. It shows that there are large differences in the percentages of Whites, Hispanics and Blacks who possess literacy skills at or above the level of the typical clerical worker in the young adult population.

Figure 91 shows relationships of years of education and ethnicity to proficiency on each of the three literacy scales of the 1986 young adult literacy survey. A disturbing finding is that the average proficiency on each of the three literacy scales of Black college educated young adults is slightly below that of White high school graduates. More important, however, is the finding that the average Black college graduate possesses proficiency in literacy below the average proficiency of young adult clerical workers. This is true across all three literacy scales. Together, the data of Figures 90 and 91 suggest that Blacks, including college graduates, will find it difficult to compete with Whites and Hispanics for managerial, technical and professional jobs in the foreseeable future.

Literacy, Job Knowledge and Performance

While there are repeated studies of education, intelligence, aptitude, and achievement and occupational status, there are very few sources of information regarding the relationship of literacy to actual job knowledge and job performance. Figure 92 presents data from military studies showing relationships among reading, job knowledge and job performance. In this work, a commercially available, standardized reading test was used to measure reading skill levels expressed in "reading grade levels." For instance, a reading level of 6.5 means that a person has scored on the reading test like the typical child in the 5th month of the 6th grade.

Job Knowledge tests were paper-and-pencil, multiple-choice tests of job knowledge that supervisors and job incumbents said was essential knowledge for performing the job. Job Performance tests were actual job tasks that were performed in a "hands-on" manner. For instance, Cooks cooked scrambled eggs and other things, Supply Specialists filled-out supply orders, automobile Repairman repaired bleeding brakes and performed other repairs to broken vehicles, and so forth.

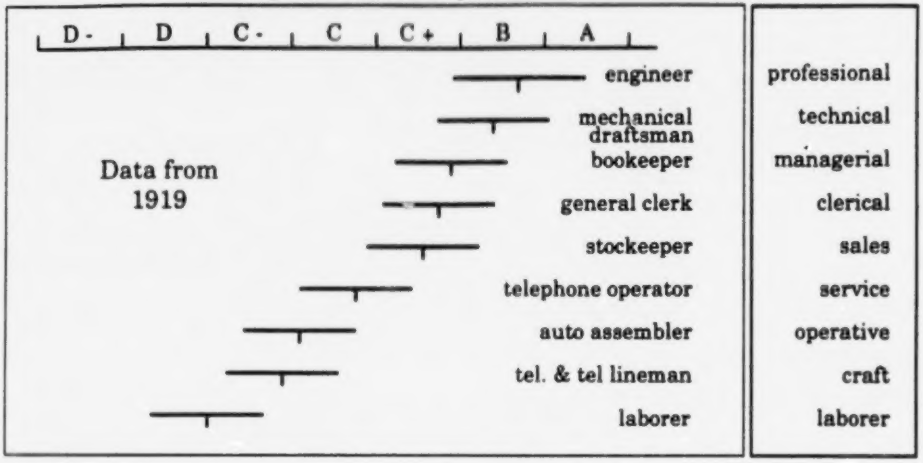
Figure 92 shows that reading is related to both Job Knowledge and Job Performance test performance. For instance, in the Supply Specialists job, on the hands-on, Job Performance test, 66% of workers with reading skills in the 4-5.5 level performed in the bottom quarter of performers. On the other hand, 56% of workers with reading skills at the 11-14.5 grade levels were in the top 25% of job performers. These figures show that, even though correlation coefficients may be low (ranging from .26 for Repairman to .40 for Supply Specialists on the hands-on, job sample tests; and from .40 for Supply Specialists to .57 for Armor Crewman), the quarter distributions reveal considerable relationships of reading to job proficiency, particulary at the lowest and highest levels of reading.

Figure 93 shows these relationships in a different manner. There the percent of job incumbents who scored 50% or better on the Job Knowledge and Job Performance tests for Mechanics (Repairmen), Supply Specialists, and Cooks is presented for people having increasing levels of reading skill. These data support those of Figure 92 in showing strong relationships of reading ability to job proficiency (see especially the solid, black lines in Figure 93 that average over the three jobs).

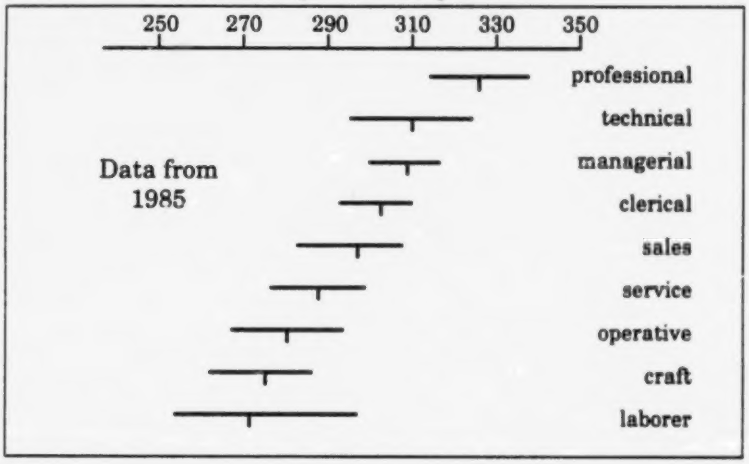
A final, important finding from these military studies is summarized in Figure 94. That figure shows how the performance of Supply Specialists and Repairman improved on the hands-on, Job Performance tests as both a function of increasing reading ability (the horizontal axis) and whether or not the person used the available technical manuals while performing the job sample test tasks (upper, solid curve). This figure is unique in showing that job performance may increase as both a function of having a higher level of reading skill *and* of actually using that skill while performing a job task.

Taken together, the data on literacy, occupational status and job performance indicate that both the types of occupations for which people are likely to qualify and the job proficiency they are likely to exhibit in the job they get may be related to their levels of literacy. The relationships are not perfect, far from it, yet the trends are there, and they have been there for some three-quarters of this century. In the absence of major changes in the manner in which society allocates work and workers to jobs, and to the extent that increased educational levels do not lead to greater literacy proficiency for minorities, it is likely that these trends will last far into the next century. This will pose considerable economic duress on the underskilled, particularly African-Americans, but Hispanics and poorly educated and less literate Whites, too.

FIGURE 89 **Intelligence, Literacy and Occupations**


"Intelligence" and Occupations

Source: Yerkes, R. M. (Ed.) (1921). Psychological examining in the United States Army. Washington, DC: Memoirs of the National Academy of Sciences. (pp. 827-829).


"Literacy" and Occupations

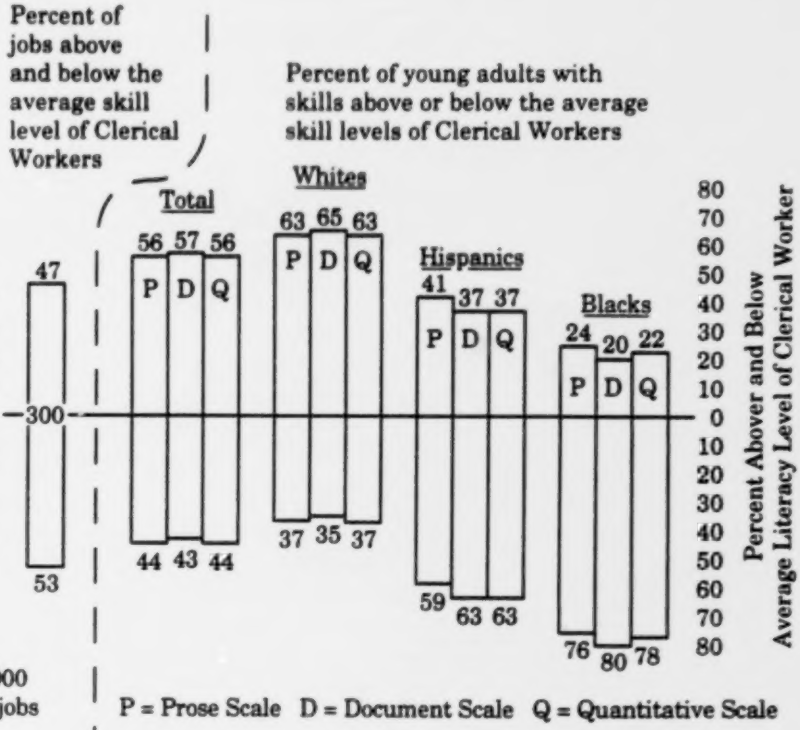
Source: Barton, P., and Kirsch, I. (1990, July). Workplace competencies: The need to improve literacy and employment readiness. Washington, DC: U. S. Government Printing Office. Document scale (table 1, p. 14).

This figure shows that whether one calls adult cognitive skills "intelligence," as in 1919 during World War I, or "literacy," as in 1986 when the profiles of young adult literacy were published, the distributions of cognitive skills in different occupational categories remains the same. The least skilled are found more often in the lower-status, lower paying occupations, which typically demand less education, while the more highly skilled are found in the higher-status, better paying, more educationally demanding occupations. Interestingly, during World War I, over 30% of laborers had their "intelligence" assessed using the Army Beta test for illiterates or non-English speakers (see Part 1of this Compendium). The 1985 young adult literacy survey used a literacy test for all those surveyed (non-English speaking were excluded). The fact that a literacy-based test could be given to almost all young adults, including laborers, in 1985 reflects the fact that considerable gains have been made in rendering the population literate in the last three-quarters of a century. Despite this, the least skilled still occupy the lower rungs of the occupational ladder.

FIGURE 90 Prose, Document, and Quantitative Literacy Levels

Number of jobs in each occupational area in the year 2000.	Occupational Area	%
17,192,000	Professional	13.5
4,796,000	Technical	3.8
15,176,000	Managerial	11.9
22,104,000	Clerical	17.4
14,806,000	Sales	11.7
22,016,000	Service	17.3
12,859,000	Operative	10.1
13,696,000	Craft	10.8
4,373,000	Laborer	3.4
127,018,000		

(Note: This excludes 3,941,000 farming, forestry and fishing jobs in the year 2000.)



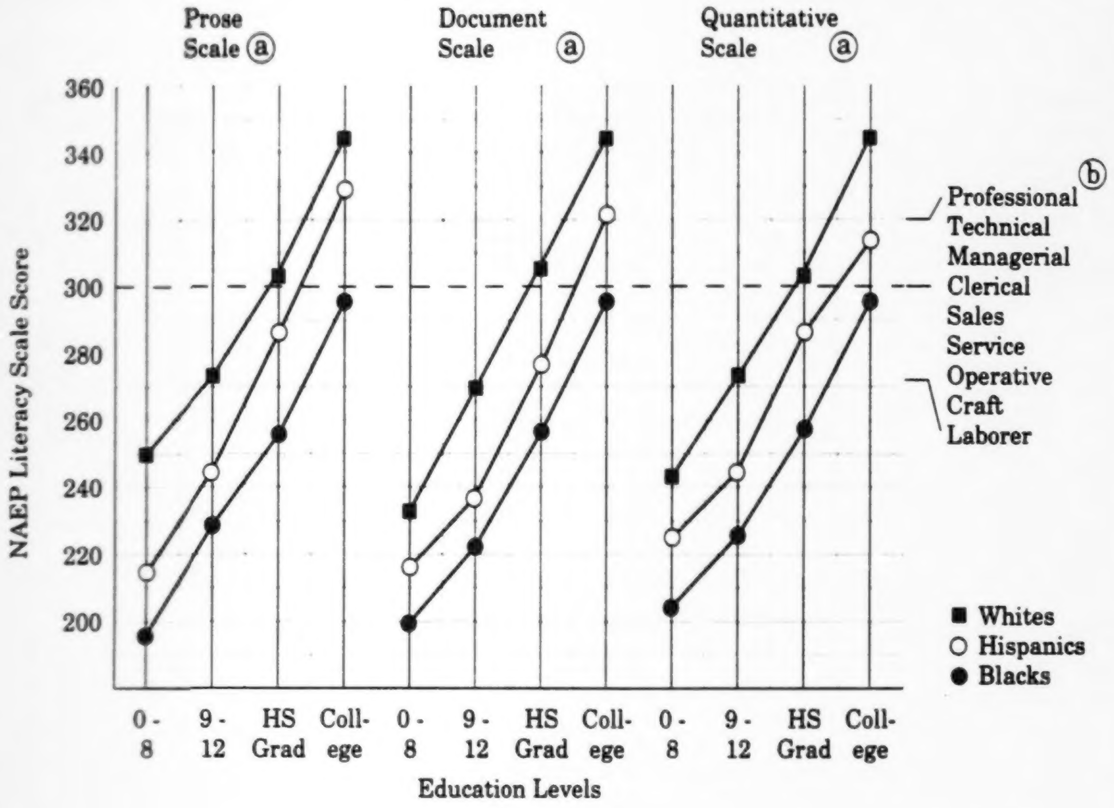
Sources: Jaffe, M.P. (1987) Workforce 2000: Forecast of occupational change. Technical Appendix. Indianapolis, IN: Hudson Institute, Inc. Table 11, p.2, bottom.

Source: For young adults above and below the literacy level for Clerical workers is I. Kirsch and A. Jungeblut (1986, September). Literacy: Profiles of America's Young Adults. Final Report. Princeton, NJ: National Assessment of Educational Progress at Educational Testing Services, pp. IV-15, Figure 4.1, IV-18, Figure 4.2, and IV-21, Figure 4.3.

Source: For average scale score, (300) for Clerical workers on the Prose, Document and Quantitative Scales is P. Barton and I. Kirsch. (1990, July). Workplace competencies: The need to improve literacy and employment readiness. Washington, DC: U.S. Govt. Printing Office. p.14, Table 1.

Reading this figure from left to right shows that in the year 2000, there will be over 17 million professional jobs, some 22 million clerical jobs, and just over 4 million laborer jobs (the data excludes 3.9 million forestry jobs because there were no corresponding data on job holders and their literacy skills for this category in the sources summarized). While about 53% of jobs are in fields with skill levels below that of the average clerical worker, some 56-57% of young adults have skill levels in Prose, Document, and Quantitative literacy above that level. However, while two-thirds or more of Whites and 37-41% of Hispanics possess skill levels above the average level of clerical workers, only one in four or five Blacks have literacy skills above the average for clerical workers. This means African-Americans will tend to qualify mostly for the lower status, lower wage jobs of the next century.

FIGURE 91 **NAEP Literacy Scale**



ⓑ Mean proficiency scores on the NAEP Document Scale of full-time workers, age 21-25, by occupational group:1986. Source: P. Barton and I. Kirsch. (1990, July). Workplace competencies: The need to improve literacy and employment readiness. Washington, DC: U.S. Govt. Printing Office. (p.14, Table 1).

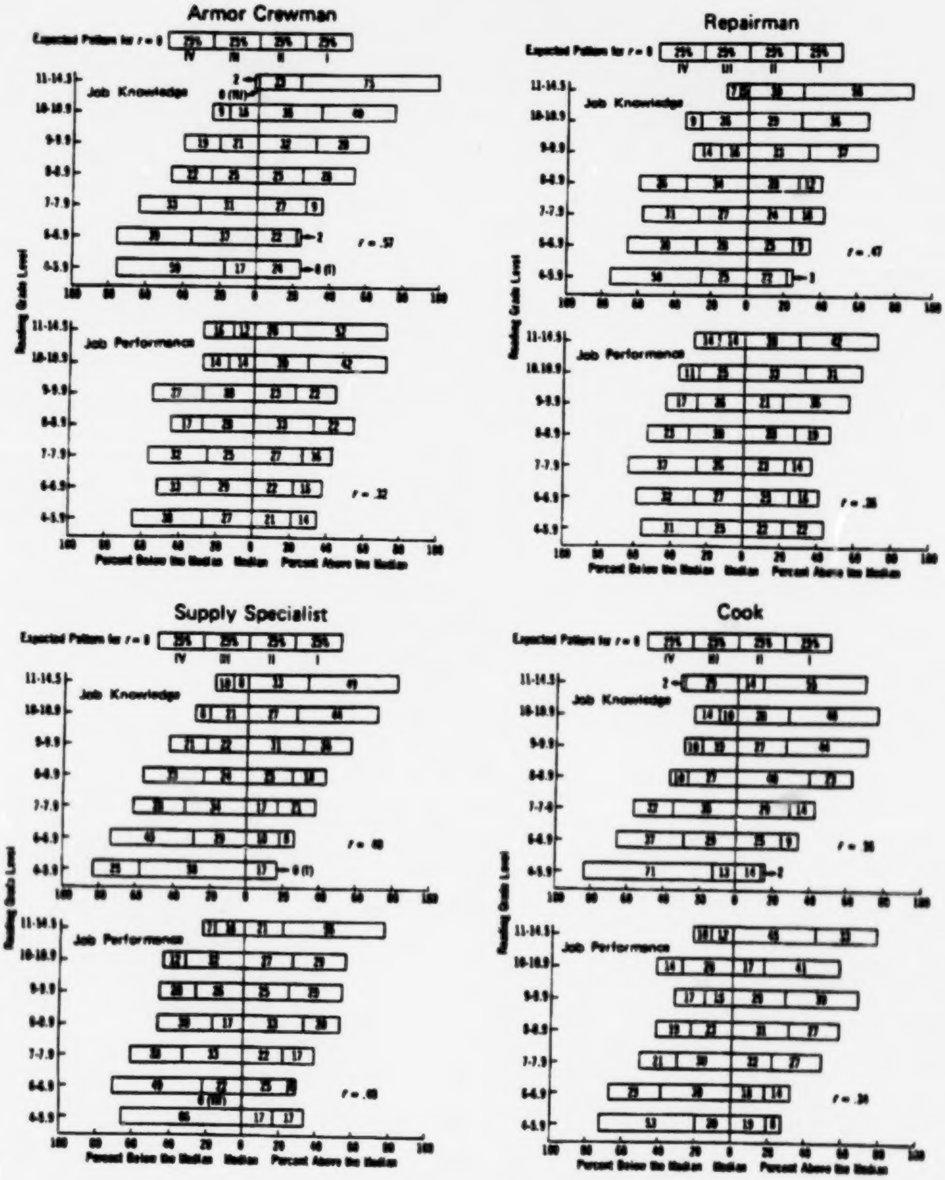
ⓐ Source: I. Kirsch and A. Jungeblut (1986, September) Literacy: Profiles of America's Young Adults. Final Report. Princeton, NJ: National Assessment of Educational Progress at Educational Testing Services. (pp. C-12, 13).

The relationships among amount of education, literacy skills of young adults of different ethnic groups, and average literacy skills of occupational groups (far right-hand side) are shown in this figure. For all ethnic groups, literacy development is clearly related to amount of education. However, for similar amounts of education, the ethnic groups differ greatly in amount of literacy skill achieved. Both Hispanic and Black high school graduates score well below the average skill level of clerical workers, while White high school graduates score above that level. Indeed, with average scores slightly below 260 on each literacy scale, African-American high school graduates score well below the average skill level of around 270 for laborers.

FIGURE 92 | **Job Knowledge and Performance**

Literacy in Relation to Job Knowledge and Performance

Quarter Distributions of Job Knowledge and Performance by Reading Grade Level: Comparison of Four Jobs



Source: Sticht, T. (Ed.). (1975). Reading for Working: A Functional Literacy Anthology. Alexandria, VA: Human Resources Research Organization. (p.69).

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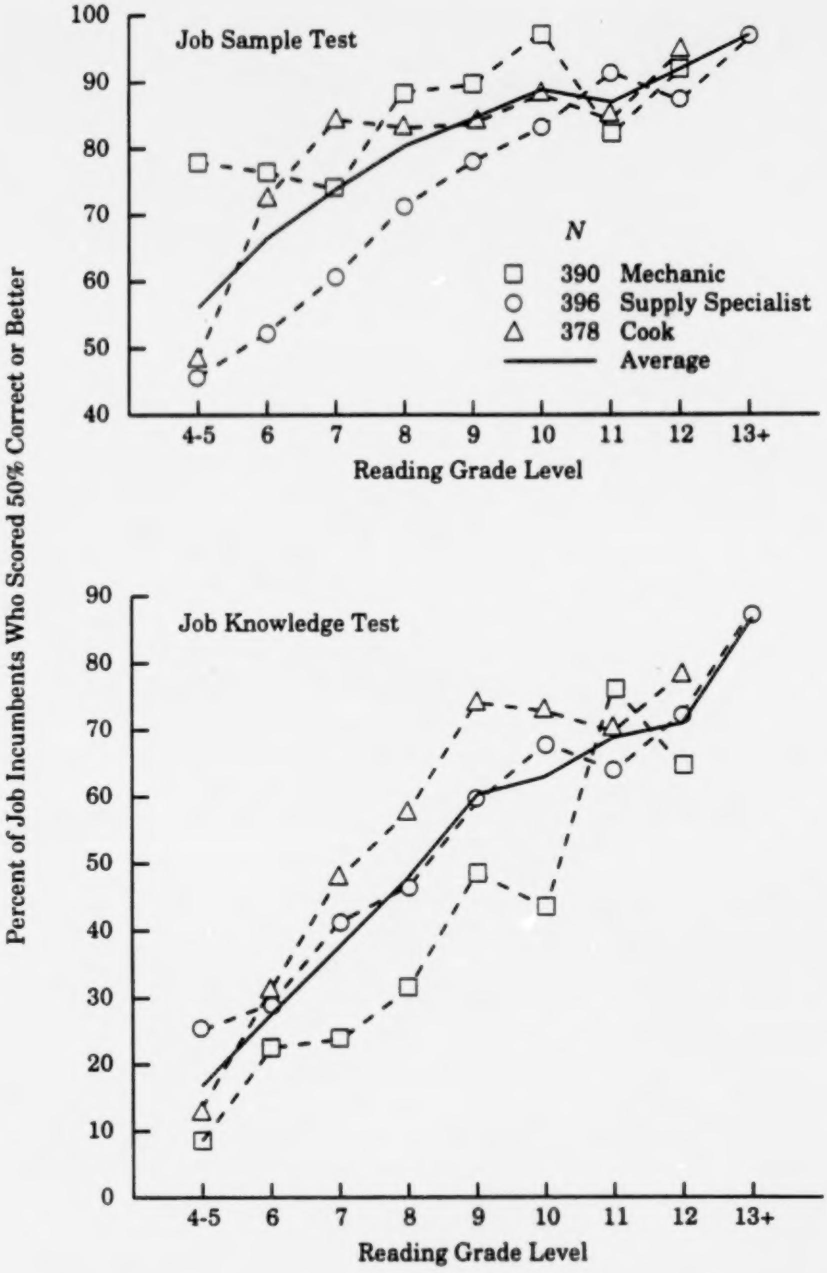
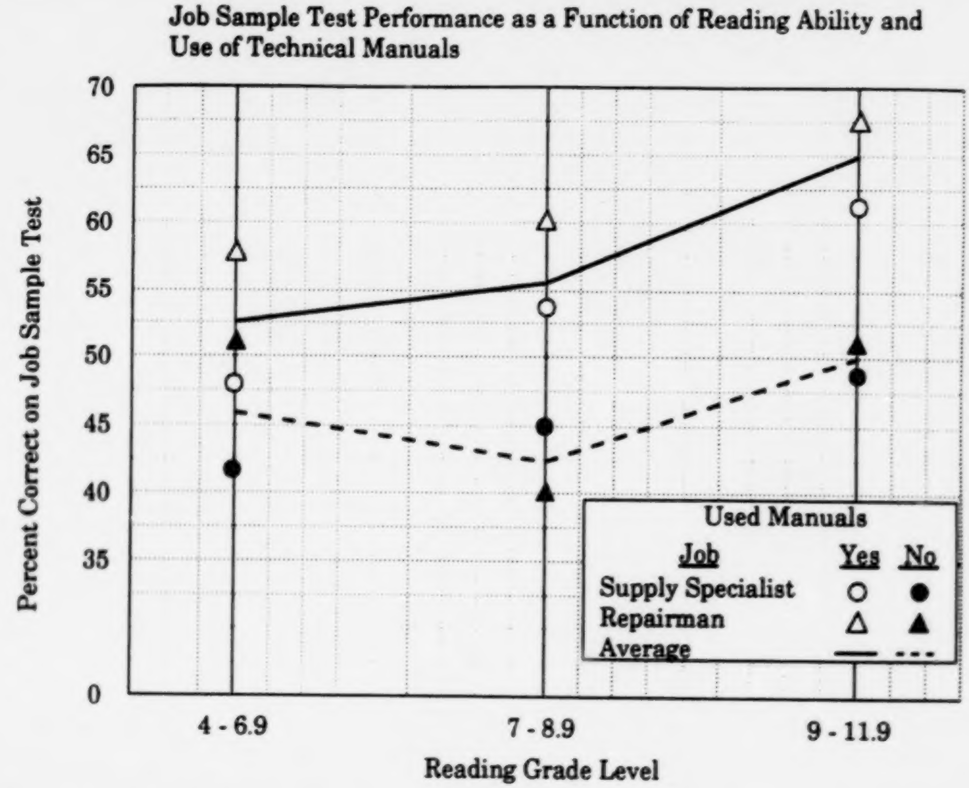
FIGURE 93 | **Literacy, Job Knowledge and Performance**



Source: Sticht, T. (Ed.). (1975). Reading for Working: A Functional Literacy Anthology. Alexandria, VA: Human Resources Research Organization. (p.116).

FIGURE 94 **Performance as a Function of Reading Ability**



Source: Sticht, T. (Ed.). (1975). Reading for Working: A Functional Literacy Anthology. Alexandria, VA: Human Resources Research Organization. (p.54).

This figure depicts perhaps the strongest evidence for the importance of literacy in job performance. The figure shows three groups of military workers having reading grade levels of 4-6.9, 7-8.9, or 9-11.9 on the horizontal axis. There are two types of workers, Supply Specialists and Automobile Repairman (mechanic). The filled points show how well workers performed actual job sample tasks in a test situation. The performance of Supply Specialists increased from around 42% for those reading in the lowest group, to 48% for those reading above the 9th grade level. The Repairman data show no relationship to reading. These differences in Supply Specialist and Repairman may reflect the fact that the Supply Specialists job tasks are inherently demanding of reading to complete forms, requisitions, etc. while the Repairman's tasks, such as adjusting the carburetor, repairing the brakes, etc. do not inherently demand reading. However, as the data points indicate, when either Supply Specialists or Repairman used the available technical manuals to aid in the performance of their job tasks, proficiency increased across all three reading groups. The top, solid line shows the average for the two jobs. The effects of both having higher levels of reading skill *and* using that skill on productivity as measured by the performance of actual job tasks can be seen by comparing the average correct scores of those in the lowest reading group who *did not* use their manuals (average of 45% correct), to that of those in the highest reading group who *did* use their manuals (average of about 65% correct). This represents about a 20% increase in productivity due to both having and using higher levels of literacy (reading).

PART 3

PART 3

TESTING OF ADULT LITERACY DEVELOPMENT IN EDUCATION PROGRAMS

CALIFORNIA'S FEDERALLY FUNDED ADULT BASIC EDUCATION PROGRAMS

THE ILLINOIS STUDY OF LITERACY PROGRAMS

THE LITERACY ASSISTANCE CENTER IN NEW YORK CITY

A SUMMARY OF GAINS IN SIXTEEN LOCAL PROGRAMS

LONGITUDINAL STUDIES

CALIFORNIA'S FEDERALLY FUNDED ADULT BASIC EDUCATION PROGRAMS

The U. S. Department of Education funds adult basic education programs in the various states. The federal government requires that states receiving federal funds report data on achievement gains made by adult learners in the programs. The data presented in Figure 95 are pre-test and post-test scores for federally funded (section 321) adult basic education (ABE) programs in California for fiscal years 1985-86 through 1991-92.

California uses the Comprehensive Adult Student Assessment System (CASAS) to measure gains for low (A), middle (B) , and higher ability (C) learners in a sample of the federally funded 321 ABE programs. The CASAS assesses reading (among other things) using "functional literacy," "real world" tasks similar to those reviewed in Part 1 of this Compendium in every study from Buswell's 1937 work to the most recent young adult and national adult literacy surveys by the NALS. However, unlike the NALS, in which respondents must construct their responses, the CASAS uses multiple-choice tasks in which respondents select the correct response from alternatives. Because of this, guessing has a higher probability of affecting CASAS scores than NALS scores.

The CASAS also differs from the NALS adult literacy surveys in that to be assigned to a given ability level on the CASAS, adults must have a 50% probability of being able to perform a task that is at the same level of difficulty. For instance, to score at the skill level of 215 on the CASAS means that a person has a 50% chance of being able to perform all items that are at the 215 level. They have a greater than 50% chance of performing items below the 215 level, and less than a 50% chance of performing items above the 215 difficulty level.

On the NALS adult literacy surveys, the standard for being assigned a skill level is that a person has an 80% probability of being able to perform tasks that are at that difficulty level. For instance, an ability level of 215 on the NALS literacy surveys means that people at that level have an 80% probability of being able to perform tasks at the 215 level of difficulty. Because the standard for performance is higher on the NALS adult literacy surveys than on the CASAS, the NALS is likely to assign more people to lower literacy levels than will the CASAS.

When assessing the reading skills of California's ABE students, pre-tests are given at the beginning of the program, and post-tests are administered following some 80-120 hours of instruction. Thus the gains shown in Figure 95 are for learners who have had about 100 hours of instruction on average.

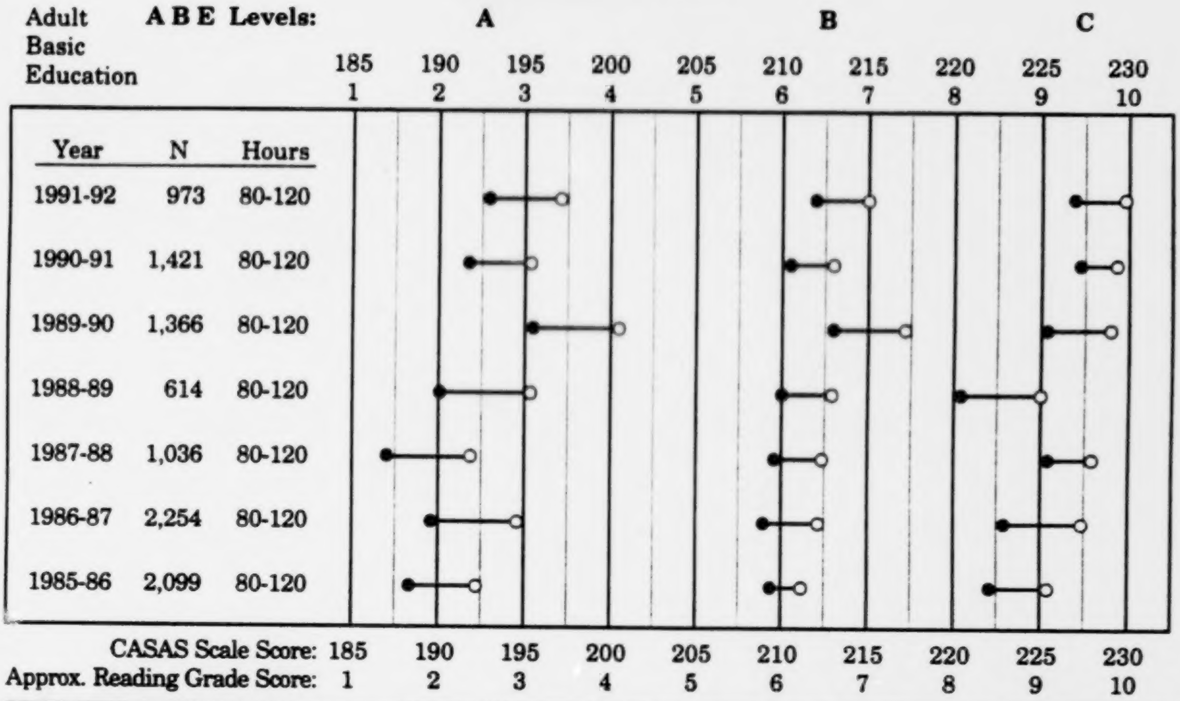
The data of Figure 95 show that, despite some fairly wide-ranging shifts in pre-test scores, resulting to some extent from changes in population and data sampling procedures, learners at each of the three ability levels consistently make about 3-5 points improvement in 100 hours of instruction. This translates, roughly, to about a half to one "year" of gain in reading grade levels (CASAS does not report scores in reading grade levels, so those given are approximations from studies in which CASAS acores were correlated with scores from the Tests of Adult Basic Education - TABE).

In the California ABE programs in 1991-92, those entering at the 192 level made about a five point gain in 100 hours of instruction. By extrapolation, if the goal is set at having all adult basic education students reach a standard of 230 in reading (roughly the 10th grade level), then since (230 - 197 = 33) and (33/5 points of gain = 6.6) one may estimate that some 660 hours of instruction will be needed for level A students to achieve the 230 criterion on the average - if the rate of gain is constant across all hours.

Presently, most ABE students leave the program at the end of 120 hours of instruction, and there are no follow-up procedures to determine how many students may have enrolled in ABE programs, dropped-out and then returned at a later date. California is moving to introduce such follow-up procedures through the use of an electronic card, similar to an automatic teller machine (ATM) card that adult students will keep with them and use to obtain adult education. The card will permit the tracking of people, courses taken, and development in literacy ability over time.

FIGURE 95 Achievement Gains For California Programs

California's Federally Funded Adult Basic Education Programs: Achievement Gains



Year	N	Hours
1991-92	973	80-120
1990-91	1,421	80-120
1989-90	1,366	80-120
1988-89	614	80-120
1987-88	1,036	80-120
1986-87	2,254	80-120
1985-86	2,099	80-120

CASAS = Comprehensive Adult Student Assessment System ● Pre - Tests ○ Post - Tests

Sources: Data for years 1985-86 through 1989-90 taken from "CASAS Statewide Accountability System for Federally Funded 321 Adult Basic Education Programs: July 1, 1989 - June 30, 1990," p. 40 Table 5, prepared for the California Department of Education, August 1990. Data for years 1990-91 through 1991-92 taken from "Student Progress and Goal Attainment in California's Federally Funded ABE Programs: July 1,1991 to June 30, 1992," p. 37, Table 6.4, prepared for the California Department of Education, August 1992. Approximate reading grade level scores for CASAS scale scores calculated using T. Sticht (1990, January). Testing and Assessment in Adult Basic Education and English as a Second Language Programs, Washington, DC: U.S. Department of Education, Division of Adult Education and Literacy, p. 35, Table A-3.

THE ILLINOIS STUDY OF LITERACY PROGRAMS

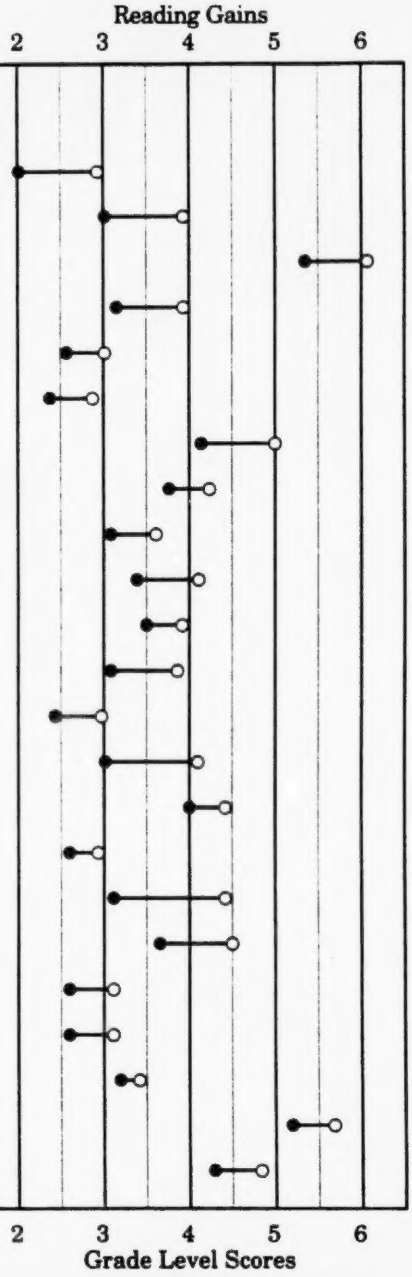
A report of reading gains made in 23 literacy programs in Illinois for fiscal year 1988 provided the data for Figure 96. The 23 programs included six Laubach Literacy Action programs, four Literacy Volunteers of America programs and thirteen "eclectic" programs. These programs were funded by the Illinois Secretary of State's Literacy Projects office and conducted by a variety of community groups, including non-profit organizations, community colleges, libraries, and public schools. The 23 programs were selected to be representative of 89 programs serving 16,400 students in Illinois in fiscal year 1988.

The test used to assess reading gain was the Slosson Oral Reading Test (SORT), a test that assesses word identification without assessing understanding of meaning. Scores on the SORT are reported in reading grade levels. The adult students were assessed at the beginning of the programs and then again every three months for a year. The SORT was used repeatedly, and hence some practice effects may have influenced gain scores. The first test was called the pre-test, and the repeated examinations given every three months were called post-test 1, post-test 2, and post-test 3. The data of Figure 96 include the pre-test and post-test 1 data to provide improvement scores comparable to the California and New York data of Figures 95 and 97. The hours of instruction between the pre-test and post-test 1 ranged from 1 to 62.5. The data obtained with repeated post-testings are given in Figure 99.

As Figure 96 indicates, there are large variations in the gains achieved in various programs. program number 17 made the largest gain, 1.4 "years", in 25.5 hours, while program number 9, with 32 hours of instruction made only .6 "years" gain. On the average, about 6.5 "months" of gain were made in some 36 hours of instruction between the pre-test and post-test 1. Generally, amount of improvement does not appear to be associated with hours of instruction.

FIGURE 96 Illinois Literacy Project: FY 88 Achievement Gains

Instructional Program	N	Hours of Instruction
1	21	23.8
2	102	39.0
3	52	40.0
4	122	17.0
5	57	54.3
6	46	29.0
7	150	17.0
8	76	14.0
9	113	32.0
10	204	21.0
11	87	21.0
12	34	26.0
13	58	62.5
14	128	40.0
15	82	33.0
16	78	1.0
17	35	25.5
18	29	20.0
19	41	30.0
20	98	20.0
21	222	22.0
22	138	22.5
23	37	21.0



Slosson Oral Reading Test ● Pre - Tests ○ Post - Tests

Sources: Bowren, Fay F., et al. (1990, April). An evaluation of reading gains within Illinois literacy projects: FY 1988. Illinois: Secretary of State, State Librarian. Pre-test scores are medians from the table on page 98, post-test scores are pre-test scores plus the post-test 1 median gain scores from the table on page 100. Summarized over programs, the median pre-test score is 3.3, median gain is +.65, giving a median post-test score of 3.95.

THE LITERACY ASSISTANCE CENTER IN NEW YORK CITY

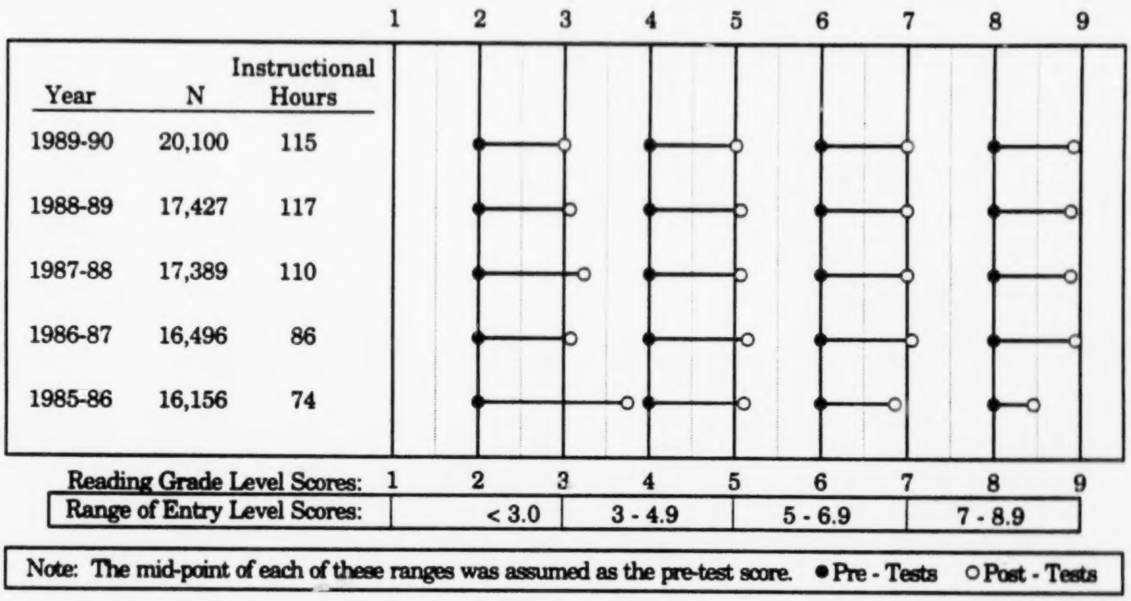
The Literacy Assistance Center (LAC) in New York City provides centralized support services to literacy provider agencies in the city. These agencies provided literacy instruction to more than 50,000 adult students in 1989-90. Of these students, over 20,000 (37%) were enrolled in adult basic education, the remainder were in English language courses.

All the provider agencies in the New York City Literacy Initiative submit data on demographics of learners and instructional factors to the LAC. The instructional factors include data on the number of contact hours and the pre- and post-test scores of students. The test used to measure reading skills is the Test of Adult Basic Education (TABE). The LAC prepares reports showing several ranges of entry level scores of learners and the gains they make in the program during the year.

Data for five years (1985-86 through 1989-90) are presented in the figure below. For this figure it was necessary to assume that the pre-test scores were at the midpoint of each of the entry ranges. For instance, in the range of entry scores from 3 to 4.9, the pre-test score for each year was assumed to be 4.0. For the lowest range, scores less than 3.0, the entry score was assumed to be 2.0 for each year.

As the figure indicates, setting aside the data for 1985-86, which was the first year data were obtained and reported by the LAC, learners made about a "year" of gain on the TABE regardless of the entry level scores.

FIGURE 97 New York City Literacy Initiative: Achievement Gains



Sources: The New York City Adult Literacy Initiative: Analysis of New York City's 1989-1990 Adult Literacy Data Base. Prepared for the Literacy Assistance Center, Inc. by Metis Associates, October 1991, p. 40, Table 29a. Pre-test score for participants entering with reading grade levels below 3.0 (< 3.0) was assumed to be 2.0 For participants in the other ranges of entering scores, Pre-test scores were assumed as the mid-point of the interval. Total N's are shown in this graphic. However, actual numbers of pre- and post-test scores were fewer than half the N's given for 1989-90, for instance. Actual N's for pre- post-tests were not given in Tables 28a or 29a of the cited report.

A SUMMARY OF GAINS IN SIXTEEN PROGRAMS

Data on pre- and post-tests for sixteen programs from different parts of the United States are summarized in Figure 98. More extensive information on the various programs is available in the sources cited below. The programs depicted were not chosen for any particular reason, they simply represent an odd lot of programs in reports ranging from 1982 to 1992. They measured reading skills using five different tests, though most used the Tests of Adult Basic Education (TABE).

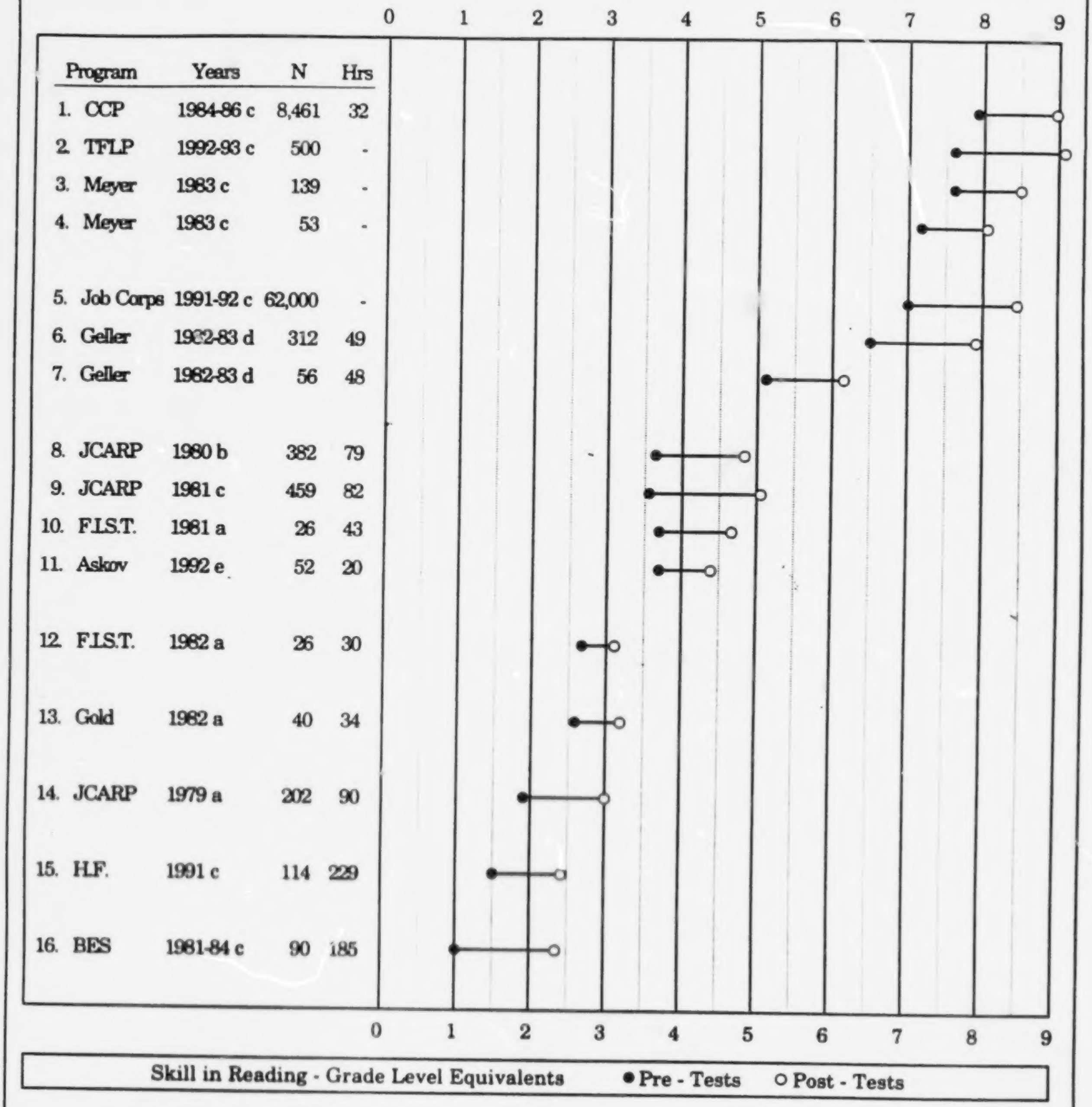
Programs in the sources numbered 8, 9, 12, 14, and 16 below were designated as "exemplary" by the U.S. Department of Education's Joint Dissemination Review Panel. Programs 6 and 11 used computer-based instruction. Program 1 summarized data from several hundred sites across the nation that used the Comprehensive Competencies Program (CCP). Programs 5, and 7 were offered in Job Corps centers. Programs 3, 4, and 13 were offered in penal institutions. It is apparent from Figure 98 that there is little relationship among entry level scores and gain or hours of instruction and gain. The 82 hours of instruction in program 5 produced more gain than the 185 hours of instruction in program 16, but about the same gain as the 49 hours of instruction in program 6. Gain in the 1979 JCARP (program 14) was about 1 "year," while the JCARP of 1981 (program 9) reported 1.5 "years" gain. However, the JCARP did not follow the standardized procedures for the Tests of Adult Basic Education (TABE) and hence the accuracy of pre- and post-test scores and the reliability of the gain is suspect.

Across the sixteen programs, improvements in adult literacy skills ranged from about 0.5 to 1.5 "years" of gain in anywhere from 20 to 229 hours of instruction using a variety of measures. In general, these gains are in the same range as those summarized earlier for California, Illinois, and New York City.

TABLE 6 Sources For Achievement Gains - Figure 98

1.	CCP	R. Taggart (1986, July). The Comprehensive Competencies Program: A summary. Alexandria, VA: Mean entry reading grade level of 7.9 extracted from Summary Table 20, p. 37; N is sum of enrollees from 1984 through the first quarter of 1986, Summary Table 6, p. 28; post-test score obtained by adding 1.0 reading gain for all terminees in Summary Table 25, p. 42 to entry mean score of 7.9.
2.	TFLP	National Center for Family Literacy (1994). The Power of Family Literacy: Louisville, KY, p.14.
3, 4	Meyer	L. Meyer, J. Ory and R. Hinckley. (1983, December). Evaluation research in basic skills with incarcerated adults. Technical Report No. 303. Center for the Study of Reading. Urbana, IL: University of Illinois. Table 2.
5.	Job Corps	Job Corps in Brief: Program Year 1991 (1 July 1991 - 30 June 1992). Washington, DC: U. S. Department of Labor, Employment and Training Administration, Job Corps. Entry score of grade 7.0 from p. 15; gain of 1.4 grade equivalents from p. 21 added to 7.0 to derive post-test score of 8.4.
6, 7	Geller	D. Geller and M. Shugall (1983, April) The impact of computer-assisted instruction on disadvantaged young adults in a non-traditional educational environment. Reston, VA: Advanced Technology, Inc., p. 16, Table 3: students with 1st post-test.
8, 9, 14	JCARP	S. Darling (1982, September). Adult education projects that work: Jefferson County (Kentucky) Adult Reading Program, Louisville, KY: Jefferson County Board of Education, Paper submitted to the U. S. Department of Education, Joint Dissemination Review Panel, p. 8, Table 6.
10, 12	F.I.S.T.	I. Saltiel (1983, March). Adult education projects that work: Project F.I.S.T. Edison, NJ: Project F.I.S.T. Paper submitted to the U. S. Department of Education, Joint Dissemination Review Panel, p. 7, Table 3.
11	Askov	E. Askov, C. Maclay, and B. Bixler (1992). An intergenerational study of the impact of computer-assisted instruction with low-literate parents. In: T. Sticht, M. Beeler, and B. McDonald (Eds.) The Intergenerational Transfer of Cognitive Skills. Volume 1: Programs, Policy, and Research Issues. Norwood, NJ: ABLEX Publishing Corporation, p. 153, Table 12.1.
13	Gold	P. Gold and P. Horn (1982). Achievement in reading, verbal language, auding, locus of control of adult illiterates in a volunteer tutorial project. Baltimore, MD: The Johns Hopkins University, p. 14, Table 2.
15	HF	H. Fingeret and S. Danin (1991, January). "They really put a hurtin' on my brain": Learning in Literacy Volunteers of New York City: Executive Summary. Durham, NC: Literacy South, p. 30.
16	BES	J. Deveraux (1985, February). BES adult literacy project. New York: Bronx Educational Services, Inc. Paper submitted to the U.S. Department of Education, Joint Dissemination Review Panel, p. 7.

FIGURE 98 Adult Basic Education Programs: Achievement Gains



Program	Years	N	Hrs
1. CCP	1984-86 c	8,461	32
2. TFLP	1992-93 c	500	-
3. Meyer	1983 c	139	-
4. Meyer	1983 c	53	-
5. Job Corps	1991-92 c	62,000	-
6. Geller	1982-83 d	312	49
7. Geller	1982-83 d	56	48
8. JCARP	1980 b	382	79
9. JCARP	1981 c	459	82
10. F.I.S.T.	1981 a	26	43
11. Askov	1992 e	52	20
12. F.I.S.T.	1982 a	26	30
13. Gold	1982 a	40	34
14. JCARP	1979 a	202	90
15. H.F.	1991 c	114	229
16. BES	1981-84 c	90	185

a Woodcock Reading Mastery Test
b Adult Basic Learning Exam
c Tests of Adult Basic Education
d Stanford Achievement Test
e Slosson Oral Reading Test

LONGITUDINAL STUDIES

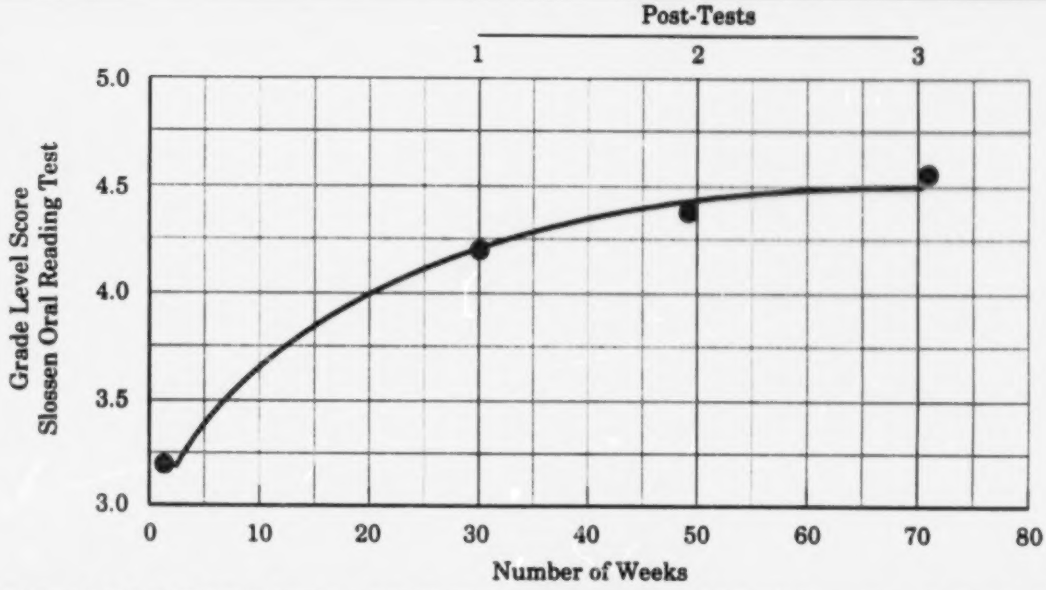
Finding systematically gathered and reported data on pre- and post-test scores in adult literacy programs is rare enough, but finding data in which adult literacy students have been repeatedly post-tested to determine their growth in literacy ability over time is extremely rare.

Figures 99 and 100 present two rare sets of data from programs in which learners were repeatedly assessed over time. Figure 99 reports data for 765 learners in Illinois who were assessed as part of the Illinois Literacy Project (see page146 of this Compendium for additional information about this project). The learners were from 23 different programs that used Literacy Volunteers of America, Laubach Literacy, or "eclectic" approaches to literacy instruction. The adult learners were tested repeatedly using the same form of the Slosson Oral Reading Test. So some practice effects are possible. As Figure 99 shows, most improvement was made between the pre-test and the first post-test. Overall gain from the pre-test to the last post-test was about 1.4 "years."

Figure 100 presents longitudinal data from the Literacy Assistance Center in New York city for adult literacy learners who were enrolled for either two or three years (see page147 of this Compendium for additional information about this project). Learners were assessed using different forms of the Tests of Adult Basic Education (TABE). The figure shows that most improvement occured between the pre-test and the first post-test, a finding similar to that of the longitudinal data for Illinois (Figure 99).The most improvement was made by those students who pre-tested at the 1.5 reading grade level. They gained about 2.0 "years."

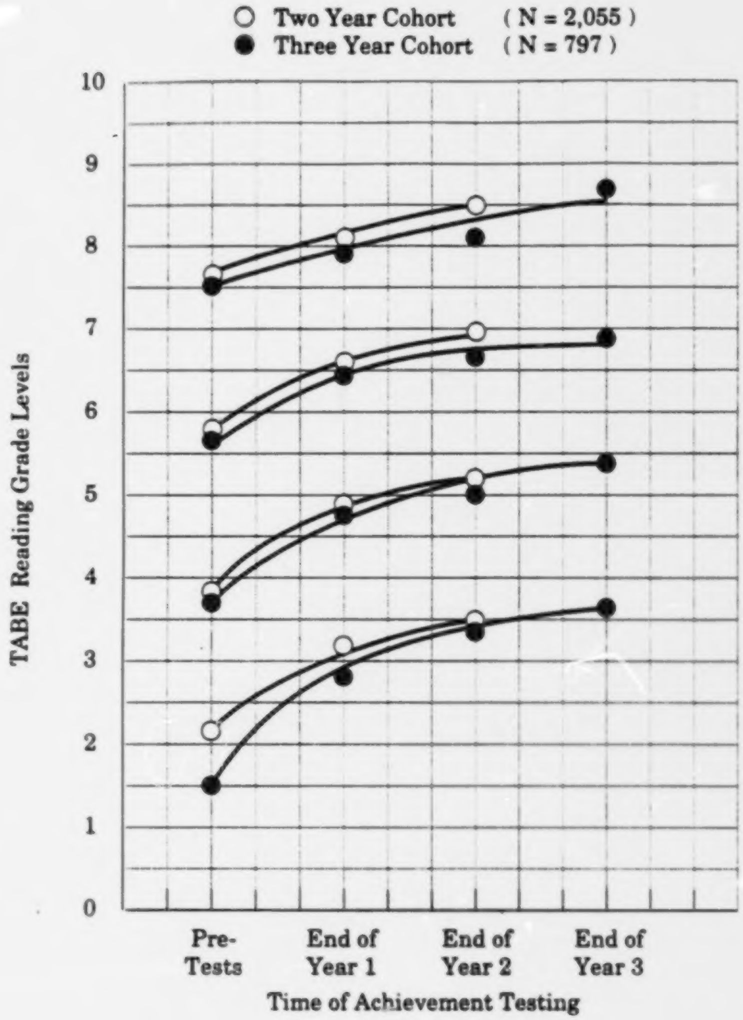
Both the Illinois and New York city data suggest that, following the first gain from the pre-test to post-test 1, subsequent improvement occurs at a lower rate. Clearly, assuming everything else stays the same, for students in these studies who score at the lower levels on the pre-tests (below the 4th grade), several years of study would be necessary for them to achieve at the 9th grade level or above.

FIGURE 99 | **Illinois Literacy Projects: FY 88 Longitudinal Achievement Gains**



Sources: Bowren, Fay F., et al. (1990, April). An evaluation of reading gains within Illinois literacy projects: FY88. Illinois: Secretary of State, State Librarian. Data for 765 students who were administered a pre-test and three follow-up post-tests every quarter for 1.4 years. Pre-test score of 3.1 is the weighted average of scores given on p. 67, Table 5-21. Successive post-test scores were obtained by adding gain scores reported on pages 63 and 64. Average contact instructional hours between the pre-test and post-test 1 was 48, between post-test 1 and 2, 29 and between post-tests 2 and 3, 34 hours of instruction. Number of weeks between pre-test and post-tests from tables on pages 110-112 of report.

FIGURE 100 **New York City Literacy Initiative: Longitudinal Achievement Gains**



Longitudinal Analysis of Mean Achievement (Grade Levels on the Test of Adult Basic Education - TABE) for students in New York City's Adult Literacy Initiative Programs who had attended either two (○), or three (●) years.

Sources: The New York City Adult Literacy Initiative: Analysis of New York City's 1989-1990 Adult Literacy Data Base. Prepared for the Literacy Assistance Center, Inc. by Metis Associates, October 1991, p. 53, Tables 43 and 44. Pre-Test scores for the three-year cohort (●) were obtained in 1987, with Year 1, 2, and 3 scores obained in 1988, 1989, and 1990. Pre-test scores for the two-year cohort (○) were obtained in 1988, with Year 1 and Year 2 scores obtained in 1989 and 1990. Mean number of contact instructional hours per year was 212.4 for the three-year cohort and 181.6 for the two-year cohort.